Vol. 1108 Number 4

OFFICIAL GAZETTE

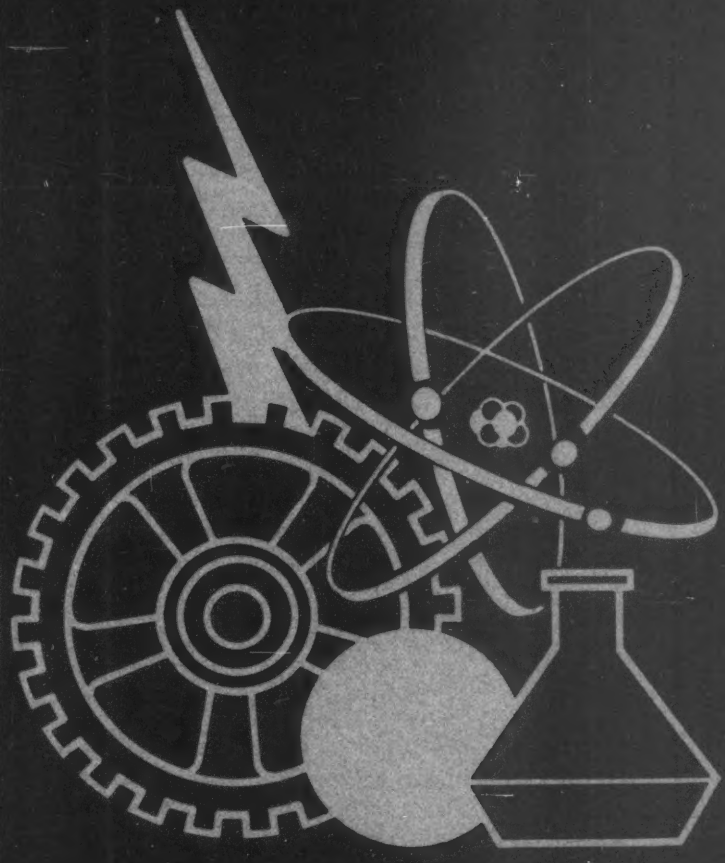
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

NOVEMBER 28, 1989



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

November 28, 1989 Volume 1108 Number 4

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1107 O.G. 5 on Oct. 3, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Sept. 1, 1989, and was announced in the *Official Gazette* at 1105 O.G. 36 on Aug. 15, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1040.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	30.00	30.00

Sept. 12, 1989. DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of October 31 , 1989.

Chemical Discipline -	April 4, 1989
Mechanical Discipline -	July 8 1988
Electrical Discipline -	April 25, 1988

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of October 31, 1989.

Chemical -	October 1, 1987
Electrical -	December 1, 1987
Mechanical -	August 4, 1987

Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the Month of October 1989.

Affirmed	178
Affirmed-in-Part	41
Reversed	125
Total Decided	344

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on November 25, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,624,015 through 4,625,333
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on November 23, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,359,783 through 4,360,929
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00"

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant..... $495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f))..... $245.00
By other than a small entity..... $490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f))..... $495.00
By other than a small enttity..... $990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f))..... $60.00
By other than a small entity..... $120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED SEPTEMBER 10, 1989 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,539,714	06/521,219	09/10/85
4,539,719	06/578,066	09/10/85
4,539,720	06/520,308	09/10/85
4,539,721	06/598,500	09/10/85
4,539,724	06/646,310	09/10/85
4,539,725	06/428,421	09/10/85
4,539,727	06/571,956	09/10/85
4,539,732	06/575,304	09/10/85
4,539,747	06/522,305	09/10/85
4,539,749	06/589,424	09/10/85
4,539,750	06/497,700	09/10/85
4,539,751	06/545,096	09/10/85
4,539,753	06/485,897	09/10/85
4,539,754	06/542,893	09/10/85
4,539,755	06/617,664	09/10/85
4,539,757	06/557,344	09/10/85
4,539,769	06/500,417	09/10/85
4,539,770	06/502,711	09/10/85
4,539,773	06/636,952	09/10/85
4,539,774	06/595,426	09/10/85
4,539,784	06/580,348	09/10/85
4,539,785	06/519,980	09/10/85
4,539,808	06/476,255	09/10/85
4,539,811	06/346,986	09/10/85
4,539,826	06/506,283	09/10/85
4,539,829	06/477,788	09/10/85
4,539,833	06/568,118	09/10/85
4,539,837	06/641,688	09/10/85
4,539,843	06/558,383	09/10/85
4,539,844	06/577,022	09/10/85
4,539,845	06/534,028	09/10/85
4,539,851	06/612,708	09/10/85
4,539,863	06/553,018	09/10/85
4,539,879	06/397,881	09/10/85
4,539,887	06/574,151	09/10/85
4,539,892	06/588,430	09/10/85
4,539,896	06/541,779	09/10/85
4,539,899	06/304,981	09/10/85
4,539,901	06/526,885	09/10/85
4,539,909	06/525,695	09/10/85
4,539,910	06/533,167	09/10/85
4,539,913	06/502,623	09/10/85
4,539,914	06/424,590	09/10/85
4,539,926	06/558,781	09/10/85
4,539,936	06/600,412	09/10/85
4,539,937	06/638,128	09/10/85
4,539,941	06/566,209	09/10/85
4,539,954	06/665,712	09/10/85
4,539,959	06/583,709	09/10/85
4,539,965	06/597,084	09/10/85
4,539,969	06/469,365	09/10/85
4,539,970	06/517,332	09/10/85
4,539,975	06/546,262	09/10/85
4,539,976	06/578,037	09/10/85
4,539,979	06/489,076	09/10/85
4,539,990	06/532,702	09/10/85
4,540,001	06/652,203	09/10/85
4,540,010	06/569,904	09/10/85
4,540,014	06/573,607	09/10/85
4,540,016	06/403,707	09/10/85
4,540,022	06/383,550	09/10/85
4,540,025	06/479,796	09/10/85

Patent Number	Serial Number	Issue Date
4,540,028	06/538,955	09/10/85
4,540,033	06/579,919	08/10/85
4,540,054	06/496,306	09/10/85
4,540,058	06/592,791	09/10/85
4,540,075	06/611,135	09/10/85
4,540,086	06/600,364	09/10/85
4,540,088	06/506,008	09/10/85
4,540,093	06/507,245	09/10/85
4,540,100	06/597,024	09/10/85
4,540,101	06/545,444	09/10/85
4,540,102	06/551,363	09/10/85
4,540,104	06/594,114	09/10/85
4,540,107	06/513,752	09/10/85
4,540,112	06/535,425	09/10/85
4,540,115	06/555,586	09/10/85
4,540,117	06/671,999	09/10/85
4,540,119	06/407,438	09/10/85
4,540,126	06/519,265	09/10/85
4,540,134	06/579,444	09/10/85
4,540,139	06/516,118	09/10/85
4,540,140	06/516,120	09/10/85
4,540,142	06/588,572	09/10/85
4,540,147	06/535,280	09/10/85
4,540,151	06/488,380	09/10/85
4,540,152	06/636,889	09/10/85
4,540,160	06/594,387	09/10/85
4,540,161	06/598,005	09/10/85
4,540,162	06/469,155	09/10/85
4,540,164	06/495,081	09/10/85
4,540,166	06/497,733	09/10/85
4,540,171	06/389,023	09/10/85
4,540,173	06/560,372	09/10/85
4,540,177	06/381,183	09/10/85
4,540,181	06/668,084	09/10/85
4,540,182	06/477,869	09/10/85
4,540,191	06/588,614	09/10/85
4,540,196	06/466,205	09/10/85
4,540,200	06/420,243	09/10/85
4,540,207	06/526,995	09/10/85
4,540,208	06/423,523	09/10/85
4,540,214	06/612,412	09/10/85
4,540,215	06/475,917	09/10/85
4,540,221	06/498,454	09/10/85
4,540,223	06/591,176	09/10/85
4,540,237	06/695,753	09/10/85
4,540,239	06/535,816	09/10/85
4,540,240	06/475,428	09/10/85
4,540,241	06/508,653	09/10/85
4,540,249	06/391,828	09/10/85
4,540,257	06/591,053	09/10/85
4,540,258	06/460,832	09/10/85
4,540,267	06/622,485	09/10/85
4,540,276	06/537,702	09/10/85
4,540,280	06/445,959	09/10/85
4,540,284	06/368,573	09/10/85
4,540,285	06/495,205	09/10/85
4,540,289	06/574,407	09/10/85
4,540,290	06/576,040	09/10/85
4,540,302	06/487,450	09/10/85
4,540,309	06/514,955	09/10/85
4,540,323	06/591,527	09/10/85
4,540,326	06/419,201	09/10/85
4,540,327	06/505,684	09/10/85
4,540,331	06/524,424	09/10/85
4,540,338	06/481,158	09/10/85
4,540,341	06/566,304	09/10/85
4,540,342	06/665,928	09/10/85
4,540,343	06/442,253	09/10/85
4,540,345	06/498,453	09/10/85
4,540,358	06/558,418	09/10/85
4,540,362	06/651,205	09/10/85
4,540,366	06/598,578	09/10/85
4,540,377	06/575,790	09/10/85
4,540,378	06/676,305	09/10/85
4,540,379	06/524,870	09/10/85
4,540,381	06/643,689	09/10/85
4,540,386	06/579,660	09/10/85
4,540,387	06/584,783	09/10/85
4,540,388	06/614,660	09/10/85
4,540,402	06/486,680	09/10/85
4,540,433	06/538,498	09/10/85
4,540,436	06/626,634	09/10/85
4,540,448	06/591,512	09/10/85
4,540,455	06/592,712	09/10/85
4,540,459	06/572,208	09/10/85
4,540,463	06/668,434	09/10/85
4,540,474	06/617,078	09/10/85
4,540,475	06/454,672	09/10/85
4,540,485	06/232,407	09/10/85
4,540,494	06/473,933	09/10/85
4,540,532	06/576,181	09/10/85
4,540,535	06/575,575	09/10/85
4,540,562	06/498,710	09/10/85
4,540,611	06/561,042	09/10/85
4,540,616	06/567,508	09/10/85
4,540,626	06/645,205	09/10/85
4,540,636	06/565,395	09/10/85
4,540,661	06/469,375	09/10/85
4,540,669	06/285,162	09/10/85
4,540,883	06/417,270	09/10/85
4,540,889	06/550,248	09/10/85
4,540,914	06/450,665	09/10/85
4,540,917	06/482,148	09/10/85
4,540,931	06/508,059	09/10/85
4,540,938	06/459,845	09/10/85
4,540,941	06/522,928	09/10/85
4,540,973	06/580,035	09/10/85
4,540,974	06/576,710	09/10/85
4,540,979	06/426,076	09/10/85
4,541,001	06/421,933	09/10/85
4,541,017	06/513,011	09/10/85
4,541,025	06/427,597	09/10/85
4,541,028	06/327,365	09/10/85
4,541,032	06/563,787	09/10/85
4,541,038	06/531,163	09/10/85
4,541,043	06/363,226	09/10/85
4,541,062	06/488,808	09/10/85
4,541,066	06/320,733	09/10/85
4,541,070	06/439,118	09/10/85
4,541,081	06/352,271	09/10/85
4,541,082	06/443,033	09/10/85
4,541,101	06/565,715	09/10/85
4,541,102	06/523,610	09/10/85
4,541,113	06/459,144	09/10/85

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S. C. 41(c)(1) and 37 CFR 1.378.

Patent No	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,474,925	06/448,684	10/02/84	12/10/82	10/27/89

Erratum

Patents Which Expired June 25, 1989
Due to Failure to Pay Maintenance Fees

Patent Number		Patent Number	Issue Date
4,542,742	Should have read	4,524,742	06/25/85

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1,21(b)).

4,701,233, Re. S. N. 423,156, Filed Oct. 18, 1989, Cl. 156/217, METHOD AND DEVICE FOR FOLDING AND SEALING SHEETS, Christian A. Beck, et al., Owner of Record: *Pitney Bowes, Inc., Stamford, Conn.*, Attorney or Agent: Robert H. Whisker, Ex. Gp.: 131

4,702,827, Re. S. N. 424,344, Filed Oct. 19, 1989, Cl. 210/117, PORTABLE FILTER, Robert J. Wenzel, Owner of Record: *The Frymaster Corp., Shreveport, La.*, Attorney or Agent: E. Micky Hubbard, Ex. Gp.: 136

4,720,782, Re. S. N. 393,965, Filed Aug. 11, 1989, Cl. 364/200, CONSOLE UNIT FOR CLUSTERED DIGITAL DATA PROCESSING SYSTEM, David Kovaicin, Owner of Record: *Digital Equipment Corp., Maynard, Mass.*, Attorney or Agent: Richard A. Jordan, Ex. Gp.: 237

4,805,743, Re. S. N. 421,839, Filed Oct. 13, 1989, Cl. 188/47, HANDBRAKE OPERATING LINKAGE FOR MULTI-UNIT RAIL CARS, Marvin G. Rains, Owner of Record: *Gunderson, Inc., Portland, Ore.*, Attorney or Agent: Donald B. Haslett, Ex. Gp.: 314

4,813,472, Re. S. N. 406,590, Filed Sept. 13, 1989, Cl. 164/463, MELT OVERFLOW SYSTEM FOR PRODUCING FILAMENTARY AND FILM PRODUCTS DIRECTLY FROM MOLTEN MATERIALS, Lloyd E. Hackman, Owner of Record: *Ribbon Tecnology Corp., Gahanna, Ohio*, Attorney or Agent: Frank H. Foster, Ex. Gp.: 325

4,824,357, Re. S. N. 422,981, Filed Oct. 17, 1989, Cl. 425/417, APPARATUS FOR MANUFACTURING SEAL COMPONENTS, Keith W. Christiansen, Owner of Record: *Chicago Rawhide Manufacturing Corp., Elgin, Ill.*, Attorney or Agent: Angelo J. Bufalino, Ex. Gp.: 135

4,832,046, Re. S. N. 423,787, Filed Oct. 18, 1989, Cl. 128/771, URINE SPECIMEN COLLECTORS AND METHOD OF DETECTING SPURIOS URINE SPECIMENS, James M. Parrish, Owner of Record: *Inventor*, Attorney or Agent: Richard P. Matthews, Ex. Gp.: 335

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,510,479, Reexam. No. 90/001,875, Requested Oct. 31, 1989, Cl. 337/91, PC-BOARD MOUNTED THERMAL BREAKER, Donald K. Merchant, Owner of Record: *Airpax Corp., Cambridge, Md.*, Attorney or Agent: E. J. Kessler, Ex. Gp.: 210, Requester: Limbach, Limbach & Sutton, San Francisco, Calif.

4,708,696, Reexam. No. 90/001,874, Requested Oct. 30, 1989, Cl. 474/103, TENSIONER FOR TOOTHED DRIVE BELTS, Kazuo Kumura, et al., Owner of Record: *Tsubakimoto Chain Co., Osaka, Japan*, Attorney or Agent: Howson & Howson, Ex. Gp.: 350, Requester: Wenderoth, Lind & Ponack, Washington, D.C.

4,732,026, Reexam. No. 90,001,872, Requested Oct. 30, 1989, Cl. 75/52, METHOD OF LAP WELDING EVENTUAL CAN BLANK CONSISTING OF METAL SHEET OR THE LIKE, Kurikatsu Ban, Owner of Record: *N.P.W. Technical Laboratories, Tokyo, Japan*, Attorney or Agent: Sughrue, Mion, et al., Ex. Gp.: 320, Requester: Saudronic A.G. Bergietikon, Switzerland

4,760,248, Reexam. No. 90/001,873, Requested Oct. 30, 1989, Cl. 255/472, PORTABLE LASER DIODE SCANNING HEAD, Jerome Swartz, et al., Owner of Record: *Symbol, Technologies Inc., Bohemia, N.Y.*, Attorney or Agent: Daniel McGlynn, Ex. Gp.: 230, Requester: Metrological Instruments Inc., Bellmawr, N.Y.

4,764,961, Reexam No. 90/001,871, Requested Oct. 26, 1989, Cl. 381/24, CASSETTE TYPE STEREO SPEAKER SYSTEM, Cheng H. Hung, Owner of Record: *Cotron Corp., Taipei, China*, Attorney or Agent: Unknown, Ex. Gp.: 260, Requester: Owner

Errata

In the "Trademark Registrations Renewed" section of the Trademark Official Gazette of Oct. 4, 1988, the Registration Date for Registration No. 437,701 was incorrectly dated as Mar. 30, 1958.

The registration date as corrected is Mar. 30, 1948.

Oct. 27, 1989 PATRICIA M. DAVIS
Administrator for
Trademark Operations

In the "Trademark Registrations Renewed" section of the Trademark Official Gazette of Aug. 1, 1989, the International Class for Registration No. 510,413 was incorrectly classified in Class 17.

The classification as corrected is International Class 19.

Oct. 27, 1989 PATRICIA M. DAVIS
Adminstrator for
Trademark Operations

The Registrant of Registration No. 865,633 listed in the "Index of Registrants" section of the Trademark Official Gazette of June 20, 1989, at TMI 2, was incorrectly identified as "ARCTO, INC., THIEF RIVER FALLS, MINN."

The Registrant's name as corrected is "ARCTCO, INC., THIEF RIVER FALLS, MINN."

Oct. 31, 1989 PATRICIA M. DAVIS
Administrator for
Trademark Operations

The following registration number was inadvertently renewed in the "Trademark Registration Renewed" section of the Official Gazette listed below:

TM 240	883,325	Sept. 26, 1989

Consequently, the above-identified registration is not renewed.

Oct. 31, 1989

PATRICIA M. DAVIS
Administrator for
Trademark Operations

The following registration number, listed in the "Trademark Registrations Issued" section of the Trademark Official Gazette of Nov. 7, 1989, was listed inadvertently:

TM 224	1,564,919	Nov. 7, 1989

Consequently, the certificate of regisdtration bearing the above-identified registration number was not issued on the datte indicated, and the registration number has been vacated.

Oct. 31, 1989

PATRICIA M. DAVIS
Administrator for
Trademark Operations

Notice of Examination for Registration
Wednesday, April 4, 1990

Pursuant to the provisions of 37 CFR §§ 10.5, 10.6 and 10.7, an examination for persons seeking registration before the United States Patent and Trademark Office as patent attorneys and agents will be held on Wednesday, *Apr. 4, 1990*. The deadline for filing applications along with the $270.00 examination fee and all necessary showings required by 37 CFR §§10.7(a) and (b) is *Jan. 31, 1990*.

With the exception of those persons who actively served four years or more in the examining corps of the United States Patent and Trademark Office for whom the examination may be waived, all persons who wish to become recognized to practice fefore the Patent and Trademark Office in patent cases must, pursuant to the above noted rules, pass the examination. Note that passing the examination does not qualify one for recognition for practice before the Patent and Trademark Office in trademark cases. Such recognition is governed by 37 CFR § 10.14 which does not require the passing of an examination.

There is no limit on the number of times the registration examination may be taken. The examination consists of two parts, a morning section and an afternoon section. To pass the examination, an applicant must pass both sections. An applicant who passes one section of any examination given on or after Apr. 7, 1987, but who fails the other section will not be required to retake the section passed, *provided* the applicant takes and passes the section failed in one of the next three examinations regularly scheduled by the Patent and Trademark Office. If the applicant does not pass the section failed within 18 months after failing the section, the applicant must retake both sections of the examination. No extensions of time will be granted except in extraordinary circumstances, e.g. an accident or hospitalization just prior to the examination which prevented the applicant from taking the examination.

Under 37 CFR §10.7(b), persons seeking registration must submit "satisfactory proof of .... sufficient basic training in scientific and technical matters...." The initial submissions of persons not having degrees in recognized subject areas, e.g. physics, chemistry, biology or engineering, are sometimes inadequate, and must be supplemented before such persons can be approved to take an examination. To afford adequate time to present any supplemental showing, it is recommended that such persons file their applications early, preferably *at least two months* before the Jan. 31, 1990 deadline.

The examination is adminitered under the supervision of the Office of Personnel Management and is given at specific locations throughout the United State where the Office of personnel Management conducts examintaion.

Application forms may be obtained from the Office of Enrollment and Discipline, Suite 810, Crystal Park One, 2011 Crystal Dr., Arlington, Va., or by mail addressed to U.S. Patent and Trademark Office, Box OED, Washington, D.C. 21231.

Oct. 25, 1989

CAMERON WEIFFENBACH
Director,
Office of Enrollment and Discipline

Status of PTO Services

The following is an update of the status of PTO services for October 1989:

Service Item	FY 1990 Goal (Calendar Days [1])	Monthly Average (Calendar Days [1])
Filing Receipts:		
Patents	22	15
Trademarks	30	18
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	15 Hours
Window Coupons	5	2
Mail Coupons	12	5
Letter Orders	16	10
Electronic Ordering Services (EOS)	11	3
Certified Copies:		
Trademark Registrations	21	35
Applications-As-Filed	17	12*
File-Wrapper/Contents	N/A	15
Walk-up Certification	1	1
Trademark Search Library:		
Filing Pending Marks	21	26**
Filing Reg. Certificates	Issue Date+2 Days	+1 Day
Filing Temp. Drawings	6	7
Assignments:		
Recording Patent-New Applications	43	87***
Recording Patents-Mail Room Recpts.	20	125***
Receipt Date of Bulk Pat. Docs. Returned by End of Month		May 8-May 28, 1989***
Recording Trademarks	20	50***
Receipt Date of Bulk Trademark Documents Returned by End of Month		July 17-July 30, 1989***
Avg. Days from Issue Fee Payment to Issue Date	90-100	74
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	+27 Days****
Patent Copies Available	95% on Issue Date	+66 Days****
Trademark Copies Available	95% on Issue Date	99% on Issue Date

[1] Unless otherwise noted.
* The 5% of orders for which fiche are not on site are not included in calculations.
** Staffing vacancies exist in TMSL. Overtime is being used to reduce the backlog.
*** Working on backlog; significant improvement should be seen next month.
**** Contractor difficulties in keeping up with the increase in the quantities of patents being issued.

Helpful Hints

•*Box Assignments*•Except for assignments submitted with a new patent application, it is strongly encouraged that assignment related documents be addressed to:

Box Assignments
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Use of Box Assignments helps to expedite receipt in the Assignment Branch by reducing processing and routing time in other PTO offices. The total elapsed calendar days to record an assignment increases if the assignment is included as one of many actions to be reviewed by various PTO offices. Accordingly, whenever practical, assignment documents should be submitted alone.

•*Proper Identification of Drawings Submitted with New Applications*• During the pre-examination processing, drawings are temporarily separated from the rest of the application papers. To facilitate the matching of drawing with the application, it would be helpful if identifying information such as the applicant's/attorney's name, attorney's docket number, phone number, and title of the invention were placed on the sheets of drawings. This information may be placed on either the front of the drawings by writing lightly in pencil or using gummed labels on the back of the drawing in accordance with 37 CFR 1.84(1).

•*Proper Identification of Substitute Drawings*• When the Office receives substitute drawings, a cover letter identifying the application by serial number must accompany the drawings. Drawings will not be matched with the files when the application serial number is missing. (See 37 CFR 1.5). The application serial number should also be placed on the front of the sheet of drawings in accordance with 37 CFR 1.84(1).

Nov. 1, 1989

THERESA A. BRELSFORD
Assistant Commissioner for Administration

PATENT NOTICES

Certificates of Correction For Week of November 28, 1989

D. 292,693	4,775,223	4,809,074	4,818,837
D. 300,226	4,776,900	4,809,130	4,819,285
Plt. 6,691	4,778,446	4,809,131	4,819,294
Plt. 6,692	4,779,826	4,810,360	4,819,299
Re. 32,796	4,781,375	4,810,534	4,819,421
4,449,585	4,781,589	4,810,729	4,819,775
4,485,868	4,782,212	4,810,764	4,820,130
4,498,535	4,783,208	4,810,878	4,820,269
4,524,827	4,784,060	4,810,951	4,820,447
4,610,160	4,787,402	4,811,039	4,820,794
4,630,007	4,789,016	4,811,228	4,821,735
4,645,004	4,789,210	4,811,263	4,821,772
4,654,089	4,791,212	4,811,292	4,821,803
4,670,181	4,792,423	4,811,757	4,822,194
4,675,539	4,794,302	4,811,786	4,822,601
4,691,170	4,797,172	4,812,304	4,822,885
4,695,753	4,797,183	4,812,430	4,823,039
4,699,963	4,797,687	4,812,448	4,823,113
4,704,155	4,798,197	4,812,457	4,823,197
4,722,146	4,798,395	4,812,695	4,823,274
4,726,028	4,798,599	4,813,591	4,823,385
4,735,970	4,799,116	4,813,597	4,823,549
4,741,389	4,799,601	4,813,744	4,824,795
4,741,641	4,800,164	4,813,785	4,824,797
4,741,975	4,800,588	4,813,863	4,824,808
4,745,268	4,800,785	4,813,978	4,825,202
4,753,672	4,801,474	4,814,514	4,826,494
4,754,163	4,803,165	4,814,744	4,827,334
4,756,742	4,803,210	4,815,120	4,827,768
4,757,533	4,803,982	4,815,873	4,828,245
4,758,574	4,804,908	4,816,097	4,829,476
4,760,059	4,805,335	4,816,745	4,830,915
4,762,620	4,805,606	4,816,804	4,831,061
4,764,586	4,806,650	4,816,832	4,831,094
4,765,695	4,806,730	4,817,124	4,831,333
4,766,832	4,807,571	4,817,495	4,831,510
4,768,624	4,807,670	4,817,518	4,831,774
4,770,657	4,807,856	4,818,385	4,832,388
4,772,061	4,807,980	4,818,610	4,832,525
4,772,207	4,808,480	4,818,772	4,836,689
4,772,296	4,808,979		

Erratum

In the Notice of Certificate of Correction Appearing at 1106 O. G. 82, of Sept. 26, 1989, Patent No. 4,712,761 should be Patent No. 4,812,761.

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box _____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box 200	Mail relating to PTO Bicentennial Celebration.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box ITU	All Intent to Use documents excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 275-2562
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institite of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 376
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State University	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775

Reference Collection of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

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Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF October 21, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-20-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	5-28-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	5-27-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 S. LEVY, Acting Director	9-21-87
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	10-21-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	4-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during October 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,694,814 to 3,702,011 inclusive
Plant Patents ..... None

REEXAMINATIONS

NOVEMBER 28, 1989

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,555,415 (1160th)
VITREOUS ENAMELS

John L. Mumford, Saffron Walden, and Roger F. Price, Haverhill, both of England, assignors to TI (Group Services) Limited, Birmingham, England

Reexamination Request No. 90/001,480, Apr. 4, 1988.
Reexamination Certificate for Patent No. 4,555,415, issued Nov. 26, 1985, Ser. No. 683,617, Dec. 19, 1984.
Claims priority, application United Kingdom, Dec. 21, 1983, 8334118

Int. Cl.[4] B05D *3/02*

U.S. Cl. 427—193

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 4 and 9 are cancelled.

Claims 1, 5, 6, 7, 8, 10, and 15 are determined to be patentable as amended.

Claims 2, 3, 11, 12, 13 and 14, dependent on an amended claim, are determined to be patentable.

New claims 16–23 and 24 are added and determined to be patentable.

1. A process for applying a vitreous enamel comprising[;]: applying [a powdered] *an aqueous slurry* vitreous frit to a metal, said vitreous frit having *a powdered metal admixed therewith and* a water content of up to 0.03% by weight; and then firing the coated metal at a temperature in excess of the melting point of the frit, in a furnace having an atmosphere with a dew point of up to 10° C.

B1 4,574,859 (1161st)
RIM ASSEMBLY

William T. Smith, Uniontown, Ohio, assignor to Motor Wheel Corporation

Reexamination Request No. 90/001,659, Dec. 5, 1988.
Reexamination Certificate for Patent No. 4,574,859, issued Mar. 11, 1986, Ser. No. 734,241, May 14, 1985.
Continuation of Ser. No. 458,240, Jan. 17, 1983, abandoned.

Int. Cl.[4] B60B *25/18*

U.S. Cl. 152—410

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claim 3 is confirmed.

Claim 1 is determined to be patentable as amended.

Claim 2, dependent on an amended claim, is determined to be patentable.

New claims 4, 5, and 6 are added and determined to be patentable.

1. A rim assembly for mounting a pneumatic tire thereon, said rim assembly comprising:

(a) a cylindrical rim base having first and second axial ends and a pair of annular grooves in an outer circumferential surface of said rim base near said first axial end, *said grooves being spaced apart from each other axially along said outer circumferential surface of said rim base and separated from each other by a portion of said rim base protruding between said grooves and defining that portion of said circumferential surface disposed between said grooves;*

(b) an annular sealing member, a first portion of said sealing member being located in the annular groove that is furthest away from the first axial end of said rim base and a second portion of said sealing member extending radially outwardly of the radially outer circumferential surface of said rim base;

(c) a split lock ring, said lock ring having a specified position such that a first portion of said lock ring is located in the annular groove that is closest to the first axial end of said rim base, a second portion of said lock ring extending radially outwardly of the annular groove that is closest to the first axial end of said rim base, said second portion having an axially inner surface for engaging a bead seat band and a radially outermost surface that has a predetermined radius when the lock ring is in said specified position; and

(d) a generally cylindrical bead seat band having first and second axial ends and radially inner and outer surfaces, said bead seat band being coaxial with and slidably mounted about *said outer circumferential surface of* said rim base such that the first axial end of the bead seat band is the nearest to the first axial end of said rim base, the radially inner surface of said bead seat band comprising:

(i) a first *surface* portion that is cylindrical *and circumferentially continuous*, said first portion having a radius that is slightly larger than the predetermined radius of the radially outermost surface of the second portion of said lock ring, said first portion extending from the first axial end of said bead seat band for a predetermined axial length, said first portion being located radially outwardly of the radially outermost surface of the second portion of said lock ring when said lock ring is in said specified position;

(ii) a second *surface* portion extending generally axially and radially inwardly from the axially inner end of said first portion and having a contour that is complementary to the axially inner surface of the second portion of said lock ring, said second portion engaging the axially inner surface of the second portion of said lock ring when said lock ring is in said specified position;

(iii) a third *surface* portion that is inclined generally axially and radially inwardly from the axially inner end of said second portion to a minimum radius, said minimum radius being only slightly larger than the radius of the outer circumferential surface of said rim base, said third portion engaging said sealing member to form an air-tight seal when said lock ring is in said specified position; and

(iv) a fourth *surface* portion extending axially inwardly from the axially inner end of said third portion, said

fourth portion being cylindrical and having said minimum radius;

the axial length of the first portion of the radially inner surface of said bead seat band [is] *being* measured from the first axial end of said bead seat band to an axially outer end of the second portion of the radially inner surface of the bead seat band, and when the bead seat band is slid axially inwardly so that the third portion of the radially inner surface of the bead seat band does not contact the sealing member, said axial length is at least as great as the axial distance from the axially outermost end of the second portion of the radially inner surface of said beat seat band to the axially innermost point where said lock ring intersects a cylinder that is coaxial with said assembly when any part of said lock ring is displaced radially outwardly from said specified position, said cylinder having the same radius as the radius of the first portion of the radially inner surface of said bead seat band.

REISSUES

NOVEMBER 28, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,118

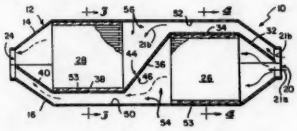
EXHAUST PROCESSOR

George E. Scheitlin; Mark A. Sickels, and Robert T. Usleman, all of Columbus, Ind., assignors to Arvin Industries, Inc., Columbus, Ind.

Original No. 4,625,511, dated Dec. 2, 1986, Ser. No. 639,803, Aug. 13, 1984. Application for reissue Jul. 5, 1988, Ser. No. 215,225

Int. Cl.[4] F01N *3/24, 3/02*

U.S. Cl. 60—299 30 Claims



1. An exhaust processor assembly comprising

a housing including an interior wall, an inlet for introducing a combustion product into the housing and an outlet for exhausting combustion product from the housing,

first and second substrate means for treating combustion product introduced into the housing through the inlet, the first substrate means having an outer boundary, the interior wall of the housing and the outer boundary of the first substrate means cooperating to define a *first* passageway therebetween, *the second substrate means having an outer boundary, the interior wall of the housing and the outer boundary of the second substrate means cooperating to define a second passageway therebetween,* and *first* bypass means for [distibuting] *distributing* distributing a portion of the combustion product introduced into the housing through the inlet to the second substrate means for treatment therein through the *first* passageway such that said distributed portion bypasses the first substrate means without flowing inside the outer boundary of the first substrate means to reach the second substrate means, *and*

second bypass means for distributing combustion product exhausted from the first substrate means through the second passageway to the housing outlet for exhaustion therethrough without flowing inside the outer boundary of the second substrate means to reach the housing outlet.

Re. 33,119

SELECTIVE TEMPERATURE CONTROL SYSTEM

Daniel A. Baker, Minnetonka, Minn., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Original No. 44,888,238, dated Dec. 18, 1984, Ser. No. 317,333, Nov. 2, 1981. Continuation of Ser. No. 939,551, Dec. 9, 1986, abandoned, which is a division of Ser. No. 108,694, Dec. 31, 1979, Pat. No. 4,315,413. Application for reissue Mar. 7, 1988, Ser. No. 168,525

Int. Cl.[4] G01K *3/00, 7/24;* G06F *15/20*

U.S. Cl. 374—102 19 Claims

6. A method of determining the temperature to which a temperature sensor is exposed, comprising the steps of:

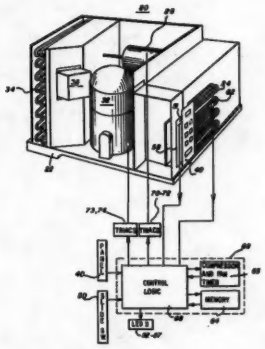
providing a reference resistor;

providing a capacitor;

providing means for charging the capacitor a predetermined amount sequentially through the reference resistor and the temperature sensor;

the capacitor by the predetermined amount a first time through the reference resistor to obtain a first indication of the time required to charge the capacitor by the predetermined amount;

charging the capacitor by the predetermined amount a second time through the temperature sensor to obtain a second indication of the time required to charge the capacitor by the predetermined amount; and



comparing the first indication to the second indication to determine the temperature to which the sensor is exposed.

Re. 33,120

METHOD FOR DRIVING LIQUID CRYSTAL ELEMENT EMPLOYING FERROELECTRIC LIQUID CRYSTAL

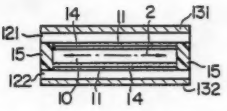
Yoshiharu Nagae; Masato Isogai, both of Hitachi; Hideaki Kawakami, Mito, and Fumio Nakano, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original No. 4,508,429, dated Apr. 2, 1985, Ser. No. 484,462, Apr. 13, 1983. Application for reissue Apr. 1, 1987, Ser. No. 34,171

Claims priority, application Japan, Apr. 16, 1982, 57-62325

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—350 S 42 Claims



10. A method for driving a liquid crystal element including a liquid crystal interposed between a pair of substrates which have electrodes on their confronting surfaces, said method comprising the steps of:

applying to said liquid crystal a first voltage signal of one polarity which defines a light transmitting state of said liquid crystal element; and

applying a second voltage signal to said liquid crystal before and/or after the application of said first voltage signal, said second voltage signal having an opposite polarity to that of said first voltage signal and enabling maintenance of the light transmitting state of said liquid crystal element defined by the application of said first voltage signal.

Re. 33,121

METHOD AND COMPOSITION FOR TREATING WOOD WITH PENTACHLOROPHENOL

Roy P. Kirchner, Houston, Tex., assignor to Idacon, Inc., Houston, Tex.

Original No. 4,296,152, dated Oct. 20, 1981, Ser. No. 135,992, May 8, 1980. Application for reissue Nov. 5, 1982, Ser. No. 439,484

Int. Cl.[4] B05D *1/18, 3/00;* **C09D** *5/16, 5/18*

U.S. Cl. 427—440 **19 Claims**

3. A method of preserving wood against decay and attack by insects and fungi by impregnation of the wood with pentachlorophenol, said method comprising the steps of preparing a solution of about 25 to about 55 percent by weight of pentachlorophenol in an organic solvent, preparing a finely divided dispersion of the solution in water in which the pentachlorophenol content is from 0.1 to 10 percent by weight, and impregnating wood with the dispersion.

PLANT PATENTS

GRANTED NOVEMBER 28, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,059

DUEROM

Guenter Duemmen, Dammweg 18-20, D-4134 Rheinberg 4, Fed. Rep. of Germany

Filed May 20, 1988, Ser. No. 196,279

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium known as Duerom, as described and illustrated, and particularly characterized by a new color, dark foliage with zonation, very good durability under outdoor summer conditions, and a great number of large umbels with many flowers.

7,060

DUELEG

Guenter Duemmen, Dammweg 18-20, D-4134 Rheinberg 4, Fed. Rep. of Germany

Filed May 20, 1988, Ser. No. 196,280

Int. Cl.[4] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of geranium known as Dueleg, as described and illustrated, and particularly characterized by the combination of characteristics of robust foliage, early flowering, glossiness on the upper sides of the leaves, and red flowers with dark spots on the upper petals.

PATENTS

GRANTED NOV. 28, 1989

ERRATA

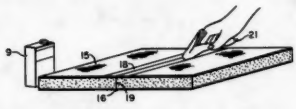
For CLASS	See PATENT NO.
029-857	4,882,842
192-045	4,882,941
122-383	4,883,036
606-096	4,883,048
206-534	4,883,182
222-073	4,883,268
033-009	4,883,344
449-009	4,883,402
437-037	4,883,543
552-235	4,883,611
428-423	4,883,615
424-195	4,883,673
420-502	4,883,745
564-414	4,883,787
540-145	4,883,790
524-098	4,883,860
310-040	4,883,981
310-062	4,883,982
330-004	4,884,044
346-160	4,884,188
360-105	4,884,261

PATENTS

GRANTED NOVEMBER 28, 1989

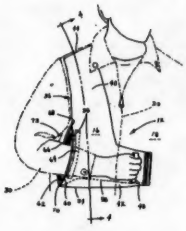
GENERAL AND MECHANICAL

4,882,785
UNDERWATER DIVER'S DRY SUIT HAVING A PERMANENTLY COMPRESSED CELLULAR LAYER
Richard W. Long, and Robert T. Stinton, both of San Diego, Calif., assignors to Diving Unlimited International, Inc., San Diego, Calif.
Division of Ser. No. 694,703, Jan. 23, 1985, Pat. No. 4,778,643, which is a continuation of Ser. No. 476,472, May 25, 1983, abandoned, which is a division of Ser. No. 372,625, Apr. 28, 1982, Pat. No. 4,388,134. This application Apr. 18, 1988, Ser. No. 182,384
Int. Cl.[4] B29C *43/20*; B32B *1/10, 31/00*; B63B *11/04*
U.S. Cl. 2—2.1 R **7 Claims**



1. A substantially constant buoyancy, high strength dry suit for underwater divers, formed from a material comprising:
an outer layer of waterproof material;
an inner layer of material;
a middle layer of permanently collapsed cellular material disposed between said outer layer and said inner layer, said cellular layer being permanently compressed such that it has very little compression and constant thermal conductivity and buoyancy with depth.

4,882,786
HUNTING JACKET INCLUDING ARM SUPPORT FOR USE WHILE CARRYING A GUN
Steven E. Gross, 1237 Nuttman Ave., Fort Wayne, Ind. 46807
Filed Nov. 10, 1988, Ser. No. 269,362
Int. Cl.[4] A41B *1/00*
U.S. Cl. 2—94 **7 Claims**

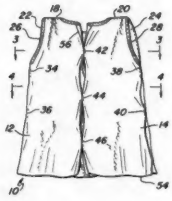


1. In a power operator for a vehicular door said door mounted by frame means so as to be driven by said operator along a track between open and closed positions, the improvement comprising:
a generally rectangular door having structural members, and structurally integrated surfaces;
an edge defined by said door surfaces;
means mounting a locking pawl to said frame for selectively abutting and clearing said edge;
means in said mounting means for moving said pawl between a door unlocked position clearing said edge and a door locked position abutting said edge, so as to prevent opening of said door when said pawl and edge are in abutment; and,
means sequentially actuating said operator and pawl moving means so as to positively lock said panel in a closed position.

4,882,787
GOLF GLOVE
Harold L. Hull, 401 Canyon Way SP 43, Spanks, Nev. 89431, and Donald Metcalf, 1280 Landerwood, Reno, Nev. 89511
Filed Sep. 2, 1988, Ser. No. 239,671
Int. Cl.[4] A41D *19/00*
U.S. Cl. 2—161 A **3 Claims**

1. A left and right golf glove, each of said gloves comprising a main glove portion having a palm, a back side, a gloved ring finger, a gloved little finger, a wrist portion, a removably attaching and detaching means to close the said wrist portion, an uncovered hand portion, said uncovered portion including the thumb, first and middle fingers and substantially including that portion of palm and back side of the hand that is exposed by a boundary line drawn substantially from the V formed by the joining of said middle and said ring fingers to the said thumb side of said wrist portion.

4,882,788
PRECUT AND PARTIALLY ASSEMBLED CLOTHING
Thelma Gray, West Chester, Pa., assignor to Made with Love, Inc., Philadelphia, Pa.
Filed Aug. 5, 1988, Ser. No. 229,079
Int. Cl.[4] A41D *27/00, 1/00*
U.S. Cl. 2—243 R **5 Claims**



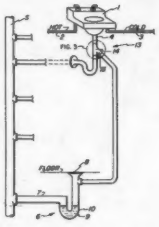
1. An unfinished article of clothing comprising:
a plurality of fabric panels adapted to be sewn together along a plurality of seams, said panels having at least one finished seam connecting said panels; and
a plurality of tacks fastening said panels to each other along the remaining seams along which said panels are to be sewn together.

4,882,789
TRAP PRIMER TAIL PIECE
Robert Kraverath, 1311 SW. 83rd Ave., No. Lauderdale, Fla. 33068
Continuation-in-part of Ser. No. 525,692, Aug. 23, 1983, abandoned. This application May 15, 1985, Ser. No. 735,282
Int. Cl.[4] E03C *1/24*
U.S. Cl. 4—191 **3 Claims**

1. A plumbing system comprising a water supply means, a

user station means for using the water supply, a first pipe means for delivering the water supply to the user station, second pipe means for draining water from the user station means, a water trap means for providing a water seal, and a primer means for delivery of water for the water seal to the water trap means, the primer means being located in the second pipe means downstream of the user station;

wherein the primer means comprises a first pipe section of the second pipe means for carrying a drain water flow, the primer means further comprising a bleed pipe section means for diverting water flowing in the first pipe section to the bleed pipe section means, the first pipe section and the bleed pipe section means being joined into a unitary member, there being an opening means for fluid communication between the interiors of the first pipe section and



the bleed pipe section means where the first pipe section and the bleed pipe section means join, the bleed pipe section means being disposed at a downward angle to the horizontal along the entire vertical length of the bleed pipe section means, whereby to cause the flow of water in the bleed pipe section means to flow downhill;

wherein the means for diverting is effective to divert continuously a portion of the drain water flow into the bleed pipe section means as the flow of water passes the opening means while the flow of water travels downhill under gravity.

4,882,790

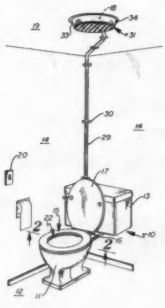
ODOR REMOVING DEVICE FOR TOILETS

Vernon F. Ricard, Rte. 2, Crookston, Minn. 56716

Filed Aug. 14, 1987, Ser. No. 85,135

Int. Cl.[4] E03D *9/05*

U.S. Cl. 4—213 **6 Claims**



1. An odor removing attachment for use with a toilet positioned in a conventional bathroom having vertical walls and a ceiling, a conventional ceiling fan for exhausting air and gases from the bathroom mounted in an opening in the ceiling, a switch mounted on the bathroom wall for energizing the ceiling fan, the toilet having a generally oval-shaped seat hinged to a bowl, said device comprising

an elongate generally L-shaped member having a plurality of longitudinally spaced apart openings therein, means for securing the L-shaped member to the lower surface of the toilet seat so that the L-shaped member extends along one side and along the rear of the toilet seat, said L-shaped member, when secured to the toilet seat, defining a chamber with said openings facing inwardly,

a saucer-shaped auxiliary closure housing for the ceiling fan positioned against the ceiling and depending therefrom, said housing including a lower wall and an annular wall integral with the lower wall extending upwardly therefrom, said closure housing having a hollow interior and having a connector element secured thereto and communicating with the interior, means connecting the closure housing with the ceiling to cover and close the inlet of the ceiling fan with respect to the interior of the bathroom,

an elongate hose having one end thereof connected to said L-shaped member and having the other end thereof connected to said connector element whereby, when said fan is energized, odors and gases will be evacuated through said L-shaped member into said hose and then into said housing.

4,882,791

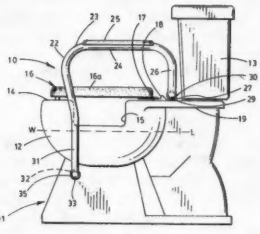
TOILET FOR DISABLED PERSONS

Robert H. Kimes, Hickory Hill, Freeport, Ill. 60132

Filed Apr. 5, 1989, Ser. No. 333,687

Int. Cl.[4] E03D *11/00*

U.S. Cl. 4—254 **8 Claims**



1. A toilet assembly for the disabled, comprising:

a toilet bowl having an open top, means for supporting said bowl in an elevated use position;

a toilet seat supported over the top rim of said bowl; and

said bowl having two enlarged entryways through opposite side walls thereof above the water line of residual water in said bowl to permit manual entry for perineal cleaning purposes said entryways being of sufficient size and extent to permit easy insertion of a user's hand, wrist and forearm into said bowl without the necessity of raising from said toilet seat.

4,882,792

AUTO-DUMP FLOW CONTROLLER

Ray T. Vincent, 3832 Sunbeam Dr., Los Angeles, Calif. 90065

Filed Apr. 11, 1988, Ser. No. 179,875

Int. Cl.[4] E03D *1/00*

U.S. Cl. 4—323 **13 Claims**

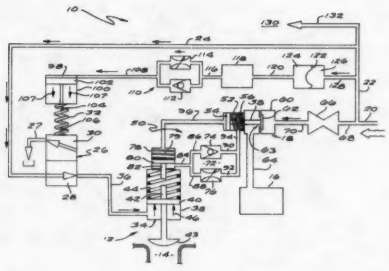
1. An automatic hydraulic valve control apparatus for use in combination with a lavatory waste tank for use in a vehicle, the tank having a drain, means for rinsing the tank, a rinse valve for controlling the means for rinsing, a fluid pressure charging inlet for pressurizing and depressurizing said valve control apparatus, the apparatus comprising:

(a) drain valve control means in fluid communication with said pressure charging inlet, having an open position and a closed position, and biased to be in an open position;

(b) drain valve means in fluid communication with said drain valve control means operative to open said drain when fluid pressure is introduced through said pressure charging inlet and said drain valve control means is in the open

position, said drain valve means having an open position and a closed position, and biased to be in a closed position;

(c) hydraulic rinse valve control means for opening and closing said rinse valve responsive to said drain valve means so as to open said rinse valve when said drain valve means is in the open position, said rinse valve control means biased to close said rinse valve when said drain



valve means is in the closed position, and including hydraulic timing means to delay the closing of said rinse valve a predetermined period of time; and

(d) a drain valve control means actuator responsive to fluid pressure from said pressure charging inlet to close said drain valve control means a second predetermined period of time after charging of fluid pressure in said pressure charging inlet.

4,882,793

DUAL FLUSH CISTERN MECHANISM

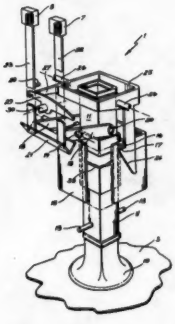
Bruce R. Thompson, Tranmere, Australia, assignor to Caroma Industries, Ltd., Norwood, Australia

Continuation of Ser. No. 109,559, Oct. 19, 1987, abandoned. This application Sep. 27, 1988, Ser. No. 249,669

Claims priority, application Australia, Oct. 20, 1986, PH8591; Jan. 8, 1987, PH9798

Int. Cl.[4] E03D *1/14, 3/12*

U.S. Cl. 4—324 **9 Claims**



1. A dual flush cistern mechanism comprising a substantially vertical stem mounted for substantially vertical movement above a flush valve of said cistern and having a flush valve seal located at its lower end; a float slidably mounted on said stem intermediate the ends thereof; a first lever arm pivotably connected to said stem at a location spaced from a first pivot in said cistern for said first lever arm, and being pivotable by each of a first and a second operating mechanism to raise said stem to open said flush valve; a second lever arm pivotable by said second operating mechanism about a second pivot in said cistern and carrying a latch member releasably engageable with said float in a high operating position, and a projection extending from said stem to limit the travel of said float into a low operating position; wherein said first operating mechanism is operable to raise said stem with said float retained in said high operating position by said latch member to open said flush valve for a first duration; and wherein said second operating mechanism is operable to substantially simultaneously raise said stem to open said flush valve to drain water from said cistern and release said latch member whereby said float drops with the water level in said cistern until said float engages said stem projection to move said stem downwardly and close said flush valve before the expiration of said first duration, said float being buoyantly movable from said low to said high position to re-engage said latch member with said float when said cistern is re-filled with water, and said first and second pivots each having a longitudinal axis which is stationary with respect to said cistern.

4,882,794

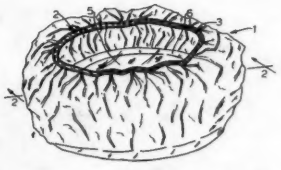
DISPOSABLE WASTE CONTAINMENT UNIT

Elijah E. Stewart, III, 117 Cameron Ct., Cary, N.C. 27511

Continuation-in-part of Ser. No. 160,523, Feb. 26, 1988, abandoned. This application Apr. 14, 1989, Ser. No. 338,531

Int. Cl.[4] A47K *11/02;* **A61G** *9/00*

U.S. Cl. 4—451 **12 Claims**



1. A disposable waste containment unit, comprising:

(a) a liquid impermeable flexible bag layer formed from circle of co-extruded polyethylene, said bag layer having a gathered upper rim and a bottom;

(b) an absorbent cellulose element, said absorbent element being located at the bottom of the bag layer; and

(c) a thin absorbent liner within said bag layer, said liner extending beyond the edge of said absorbent element but not extending to the upper rim, said absorbent element disposed between said bag layer and said liner.

4,882,795

PARTITION, MORE PARTICULARLY FOR A CORNER SHOWER

Heinz G. Baus, Wartbodenstrasse 35, CH-3626 Hünibach-Thun, Switzerland

Filed Jan. 17, 1989, Ser. No. 297,284

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1988, 3800828

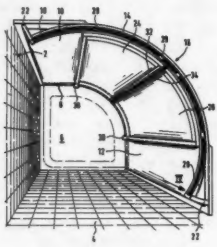
Int. Cl.[4] A47K *3/22, 7/00*

U.S. Cl. 4—607 **20 Claims**

1. In a partition for a shower tub, said partition including door-elements and two wall-elements defining an entrance into which said door-elements are slideable mounted to close and open said entrance, each of said wall-elements adapted to be arranged between said door-elements and a room-wall, the improvement comprising:

an upper curved guide-rail connected to said wall-elements, and in which said door elements are displaceably mounted, said guide-rail comprising curved end-parts located behind said wall-elements, each end-part having a

free end located at a predetermined distance from a corresponding wall-element, and



a guide-element for the lower edge of each door element, said guide-element being located laterally of said entrance.

4,882,796

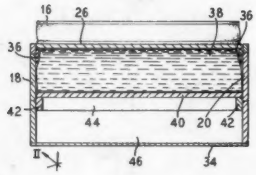
CONVERTIBLE BED FRAME

Ronald McNeal, and Ida T. McNeal, both of 45 N. Mason, Chicago, Ill. 60644

Filed Apr. 19, 1989, Ser. No. 340,508

Int. Cl.[4] A47C *19/20, 19/22*

U.S. Cl. 5—8 **9 Claims**



1. A convertible bed frame, comprising:

a first compartment having a lower support plane and surrounding lateral walls, said first compartment adapted for holding a first mattress;

a second compartment disposed beneath said first compartment and adapted for holding a second mattress said second compartment having an external opening in one of its sides,

a platform being changeable from a fully extended supporting size that is adapted to cover said first compartment and support the second mattress when it is placed thereon, to a reduced storable size that permits said platform to be inserted through said external opening for storage in said second compartment.

4,882,797

OPHTHALMIC SURGERY STRETCHER

Raymond A. Failor; Gerald Peters, both of Seville, and Mark Reuter, Chippewa Lake, all of Ohio, assignors to Hausted, Inc., Medina, Ohio

Filed Jul. 15, 1987, Ser. No. 73,677

Int. Cl.[4] A61G *7/06*

U.S. Cl. 5—66 **20 Claims**

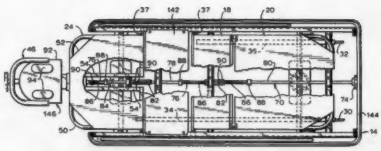
1. A stretcher comprising:

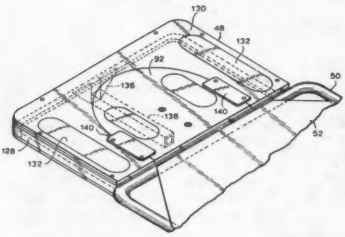
a frame;

a patient support assembly mounted to said frame, said patient support assembly including a backrest assembly;

means for moving aid backrest assembly with respect to said frame about a first pivot axis;

a headrest assembly pivotably mounted to said backrest assembly and movable about a second pivot axis which is substantially parallel to said first pivot axis, the width of said headrest assembly being substantially smaller than the width of said backrest assembly from said second pivot axis to an end of said headrest assembly opposite from said second pivot axis to facilitate a physician's access to a patient's head;





means for moving said headrest assembly with respect to said backrest assembly about said second pivot axis; and

means for mounting a wrist rest assembly to said headrest assembly.

4,882,798

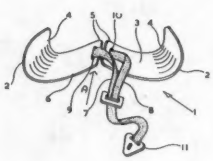
SLING FOR LIFTING A DISABLED PERSON

Jack Worsnop, 9 North View Barney NR21 ONE, Fakenham, Norfolk, England

Filed Jul. 15, 1988, Ser. No. 219,724

Int. Cl.[4] A61G *1/00*

U.S. Cl. 5—89 **20 Claims**



1. A sling for lifting the thighs of a disabled person comprising

two rigid members substantially identical to one another;

each rigid member having a cross section in a first longitudinal direction which is substantially constant and of a J-shape,

each J-shaped rigid member having an elongated portion with an arcuate portion at one end and connection means at the other end,

said arcuate portion having sufficient curvature to a point opposite said elongated portion to hook around the thigh of a person supported therein a distance sufficient to prevent the thigh from slipping sidewise out of the sling,

supporting means connecting said connection means closely together at said other end of said rigid members to form a single lifting point allowing pivotal movement of said rigid members relative to each other whereby the weight of the person being lifted maintains said arcuate portions hooked around and gripping the thighs of the person during lifting,

said sling supporting means including means for attaching the sling at said single lifting point to a lifting device in the region of said connection means.

4,882,799

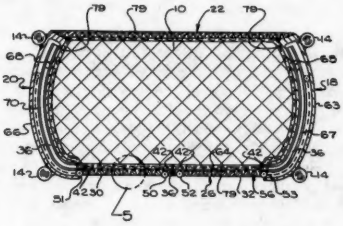
CRIB STRUCTURE

Kathy C. Shapiro, 3600 Embassy Dr., West Palm Beach, Fla. 33401

Filed Jun. 15, 1988, Ser. No. 207,299

Int. Cl.[4] A47D *7/00, 15/00*

U.S. Cl. 5—100 **18 Claims**



1. A crib for a child, comprising:

a support surface for a child;

a plurality of side walls operatively connected to the support surface, at least one of said side walls comprising a door opening and having at least one door means laterally slidable substantially in the direction to and from a most adjacent side wall;

said crib further comprising track means substantially spanning the door opening, said track means being adapted to slidably engage said door means and to direct said door means laterally to and from said adjacent side walls, said door means further comprising flexible panels and means for slidably mounting said flexible panels to said track means, said adjacent side walls further comprising pockets, said track means extending into said pockets, whereby said door means can be moved along said track means into said pockets, and whereby the child can be placed quietly and easily into and taken from the crib through the door opening without substantial bending or reaching.

4,882,800

FLOTATION MATTRESS

Tyler E. Schueler, 30 Winchester Dr., Huntington, Conn. 06484

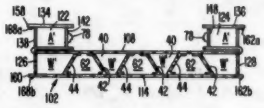
Continuation-in-part of Ser. No. 56,713, Jun. 2, 1987, Pat. No. 4,766,629. This application Aug. 29, 1988, Ser. No. 237,530

Int. Cl.[4] A47C *27/10*

U.S. Cl. 5—451 **25 Claims**

1. A flotation mattress comprising a center section, a head section and a foot section, each such head, foot and center section including an outer cover means formed to define an enclosed inner area, said outer cover means including an upper panel and a lower panel extending in spaced relationship to said upper panel, and first and second sidewalls and first and second end walls extending between said upper and lower panels to form therewith said enclosed inner area, said center section having first and second center connection means formed thereon adjacent the first and second end walls respectively thereof, and said head and foot sections each having head and foot connection means respectively formed thereon adjacent to one of said first and second end walls thereof, the head connection means of said head section cooperating with said first center connection means to releasably connect said head section to said center section and said foot connection means of said foot section cooperating with said second center connection means to releasably connect said foot section to said center section,

wherein each said head, foot and center section includes spaced longitudinally extending first and second air baffles extending along either side of said enclosed inner area between the first and second end walls thereof and pivot



means connecting said air baffles to said head, foot and center sections for pivotal movement through a 180° arc upwardly and inwardly toward said enclosed inner area, and

wherein the top panel of each said center, head and foot section extends outwardly beyond the first and second sidewalls thereof to form said pivot means and a baffle top wall for said first and second air baffles, each of said air baffles including a baffle bottom wall spaced from the respective center, head or foot section, baffle end walls extending between said baffle bottom and top walls, and first and second baffle sidewalls extending between said baffle top, bottom and end walls, one of said first or second baffle sidewalls of each said air baffle being positioned adjacent to but in spaced relation to one of the first or second sidewalls of the respective head, center or foot section.

4,882,801

ELECTRIC TOOTHBRUSH

Dieter Benz, Hirschstrasse 21, 7900 Ulm, Fed. Rep. of Germany

Division of Ser. No. 948,051, Dec. 31, 1986, Pat. No. 4,796,323, which is a continuation-in-part of Ser. No. 716,235, Mar. 26, 1985, abandoned, Continuation of Ser. No. 379,575, May 17, 1982, abandoned. This application Apr. 12, 1988, Ser. No. 180,439

Claims priority, application Fed. Rep. of Germany, May 21, 1981, 3120300; Mar. 31, 1982, 3211984

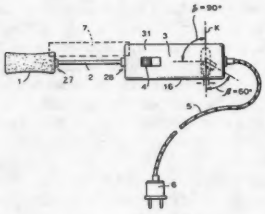
The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.[4] A46B *13/02*

U.S. Cl. 15—23 **9 Claims**

1. A motor driven electric toothbrush comprising a housing serving as a grip and accommodating an electric motor having a drive shaft; a rotary brush operatively connected to said drive shaft; at least one gravity-induced movement-responsive first switch positioned in said housing and having a switching path formed between two end points serving as contacts of said first switch, and a second switch formed as a manually actuated hand switch having an actuating element, said housing having a side wall, said second switch being positioned on said side wall, each of said switches switching the direction of rotation of the brush, said switching path of said first gravity-induced switch lying in the region of a first central longitudinal plane of said housing, said second manually operating switch having a switching path which lies in the region of a second central longitudinal plane of said housing which is perpendicu-

lar to said first central longitudinal plane of said housing, said switching path of said first gravity-induced switch forming



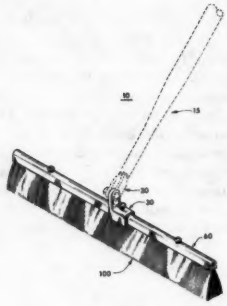
with a central axis of elongation of said housing an angle between 60° and 90°.

4,882,802

VERSATILE CONSTRUCTION BROOM HOLDER

Chester C. LeVere, Jr., 6391 W. 60th, #212, Arvada, Colo. 80003

Filed Jun. 15, 1988, Ser. No. 207,264
Int. Cl.[4] A46B *7/04, 5/02;* B25G *3/02*
U.S. Cl. 15—144 R **24 Claims**



1. An improved broom holder for finishing newly laid concrete surfaces, comprising a collar, means on said collar capable of mounting handle adaptor attachments of differing sizes and shapes quickly and easily on said collar, said handle adaptor attachment means comprising an upstanding arm on the top of said collar perpendicular to said collar extending in a vertical plane with one end face of said collar, a broom head, means on said collar to adjustably secure said collar at various positions along the length of said broom head to said broom head, and interchangeable broom strips mountable in said head.

4,882,803

DENTAL APPARATUS

Nathan J. Rogers, and Barbara R. Rogers, both of 695 Goodhue,, Beaumont, Tex. 77706

Filed Dec. 19, 1988, Ser. No. 286,257
Int. Cl.[4] A46B *9/04*
U.S. Cl. 15—167.1 **17 Claims**

1. A dental apparatus adapted for penetrating and cleaning the interstices and interproximal surfaces between the teeth, the surfaces at and below the gum margins, and the tooth-gum interfaces including the grooves and crevices thereof, comprising

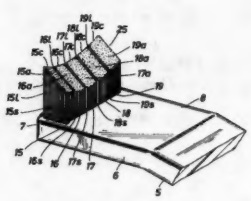
an elongated handle portion,

a head portion,

a neck portion interconnecting said handle portion and said head portion,

a plurality of tufts of bristles fixedly attached to the face of said head portion and disposed substantially perpendicularly thereof,

said plurality of tufts of bristles having wedge means, to enable penetration into said interstices, surfaces and interfaces, including the beveled free end of each of said plurality of tufts of bristles which are disposed at the longitudinal edge of said end of said head portion, said bevel sloping downwards from a vertex formed at said free end of the longest bristle in each of said tufts, and forming a substantially planar surface disposed about 40 to 50 degrees with respect to the horizontal plane of said head portion,



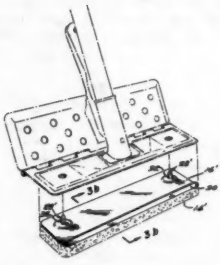
said plurality of tufts of bristles further having conforming means, to enable cleaning of said interstices, surfaces and interfaces, including said plurality of tufts of bristles having a plurality of bristles of varying lengths comprising a series of bristles in which the longer of said bristles disposed proximal to the sides of said face of said head portion being a first length, the shorter of said bristles disposed proximal to the longitudinal center of said face of said head portion being a second length, said second length being shorter than said first length, and the intervening bristles between said longer bristles and said shorter bristles being of corresponding varying length between said first length and said second length such that a concave surface to intimately contact the corresponding convex configuration of the surfaces of said teeth, and said tooth-gum interfaces and gum margins is formed by said free ends thereof.

4,882,804

PROTECTIVE MOP ATTACHMENT PLATE

Stephen W. Lucas, Westfield, Mass., assignor to Standex International Corporation, Salem, N.H.

Filed Dec. 12, 1988, Ser. No. 282,580
Int. Cl.[4] A47L *13/20*
U.S. Cl. 15—244.1 **4 Claims**



1. In a sponge mop having a metal frame, a sponge and an

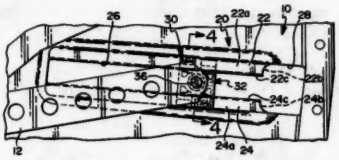
attachment plate affixed to said sponge for attaching said sponge to said frame, the improvement which comprises a lip disposed adjacent at least one edge of said attachment plate, said lip extending upwardly from the top surface of said plate in front of an edge of said frame so as to prevent said frame from contacting other objects, said attachment plate and said lip being integral and molded from a thermoplastic plastic.

4,882,805

SLIDER FOR WINDOW REGULATOR ARM

Adrian D. Campbell, and William E. Rank, both of Dayton, Ohio, assignors to General Motor Corporation, Detroit, Mich.

Filed Dec. 12, 1988, Ser. No. 282,653
Int. Cl.[4] A47H *15/00*; E05D *15/16*; E06B *7/16*
U.S. Cl. 16—93 R **5 Claims**



1. In combination,

a stationary guide member having opposed planar, spaced apart edge portions whose end faces define a linear slot therebetween,

a slider slidably connected to said guide member and which is adapted to be reciprocably moved along said slot of said guide member,

said slider having a main body portion which is adapted to be received within said slot, a first pair of integrally formed generally L-shaped portions whose free ends overlie and are adapted to engage a side of one of said edge portions, a second pair of integrally formed portions each including a deflectable ear for overlying and engaging an opposite side of said edge portion and which biases the free ends of said L-shaped portion into engagement with said one side of said edge portions of said guide member,

said main body portion having first and second integrally formed cantilevered deflectable fingers which biasingly engage said end faces of said edge portions when the main body portion is received within said slot of said guide member whereby said slider is at all times biased into engagement with said end faces and said opposite sides of said first and second edge portions so that rattling therebetween cannot occur.

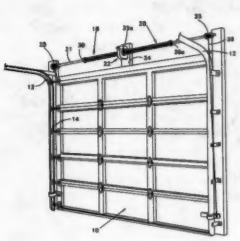
4,882,806

COUNTERBALANCING TORSION SPRING MECHANISM FOR DEVICES WHICH MOVE UP AND DOWN AND METHOD OF SETTING THE TORSION SPRINGS THEREOF

Thomas J. Davis, 629 Clifton Dr., NE., Warren, Ohio 44484

Filed Jul. 11, 1988, Ser. No. 217,321
Int. Cl.[4] E05D *15/16*
U.S. Cl. 16—198 **36 Claims**

1. A torsion spring counterbalancing mechanism for a garage door or other device to be moved up and down comprising a torsion shaft rotatable about an axis, torsion spring means comparison a torsion spring to be wound as the device moves down and unwound as it moves up disposed about said shaft, means connecting the torsion shaft with said device to rotate the shaft in a direction to wind the spring as the device moves down and for rotation in the opposite direction as the device moves up, a respective end member connected to each end of the torsion spring, torsion spring winding and adjusting means comprising a support structure mounted against movement about or along the axis of said torsion shaft, said winding and adjusting means comprising an output drive shaft coaxial with and rotatable in said structure about said axis and self-locking drive means on said structure for rotating said drive shaft in different directions about said axis to respectively wind and unwind said torsion spring, end fixing means for said torsion spring means comprising first and second connecting means connecting a respective one of said end members to a respective associated one of said rotatable torsion and drive shafts to fix the corresponding end member against relative movement



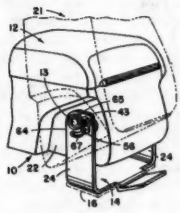
with respect to the respective rotatable shaft, one of said first and second connecting means comprising securing means for interchangeably fixing the respective end member for the connecting means to the associated shaft for rotation therewith while allowing longitudinal movement of the end member relative to its associated shaft during the winding of said spring by said winding and adjusting means or fixing the end member against movement longitudinally of its corresponding shaft and for rotation therewith for effecting the counterbalancing of said device.

4,882,807

ARMREST TORQUE CONTROL

Dale J. Frye; Alan L. Kindig; Kenneth M. Lindberg, and Robert J. Stander, all of Holland, Mich., assignors to Prince Corporation, Holland, Mich.

Filed Jul. 11, 1988, Ser. No. 217,171
Int. Cl.[4] E05D *11/10*
U.S. Cl. 16—225 **22 Claims**



1. A torque control for use in conjunction with a component pivotally mounted to a support structure for pivotal movement about a pivot pin, said torque control comprising:

a cylindrical resistance element adapted to be fixedly mounted to one of a component or structure in spaced relationship to the pivot pin, said resistance element having a predetermined diameter; and

a member composed of a resilient polymeric material for attachment to the other of the component or structure, said member having an arcuate slot spaced from the pivot pin and receiving therein said resistance element for movement longitudinally therethrough as the component pivots about the pivot pin; said slot having a width dimen-

sion relatively smaller than said diameter of said resistance element, whereby a desired frictional resistance is obtained as the component is pivotally moved, and wherein the width of said slot varies continuously along substantially the entire arcuate length through which said resistance element travels to provide a variable frictional resistance.

4,882,808

FURNITURE HINGE INCLUDING HINGE ARM RELEASABLY CONNECTED TO MOUNTING PLATE

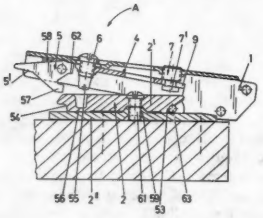
Erich Röck, Höchst; Helmut Rupprechter, Lauterach, and Klaus Brüstle, Lauterach, all of Austria, assignors to Julius Blum Gesellschaft M.B.H., Höchst, Austria

Division of Ser. No. 878,868, May 28, 1986, Pat. No. 4,800,622. This application Sep. 19, 1988, Ser. No. 246,074

Claims priority, application Austria, Oct. 19, 1984, A 3336/84; Oct. 19, 1984, A 3337/84; May 9, 1985, A 1393/85; Aug. 19, 1985, A 2404/85

Int. Cl.[4] E05D *7/06*

U.S. Cl. 16—240 **2 Claims**



1. A hinge comprising:

a mounting plate;

a hinge arm;

an intermediate member adjustably supporting said hinge arm;

engaging means at respective first ends of said mounting plate and said intermediate member for defining a pivot axis about which said intermediate member and said hinge arm are pivotable with respect to said mounting plate;

a pivot member pivotally mounted adjacent a second end of said intermediate member and having holding means to engage a latching means at a second end of said mounting plate when said hinge arm and said intermediate member are pivoted about said pivot axis toward said mounting plate and thereby to fasten said intermediate member to said mounting plate;

spring means for urging said pivot member in a first direction such that said holding means and said latching means are in engagement; and

said pivot member having projection means for, upon pivoting said pivot member in a second direction opposite to said first direction to release engagement between said holding means and said latching means, pressing against said mounting plate and thereby facilitating said release.

4,882,809

HINGE

Russell E. Uppstrom, 17 Woodlawn St., Northboro, Mass. 01532

Continuation of Ser. No. 52,533, May 20, 1987, abandoned. This application Dec. 7, 1988, Ser. No. 281,091

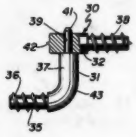
Int. Cl.[4] E05D *5/00*

U.S. Cl. 16—384 **3 Claims**

1. Hinge, comprising:

(a) an L-shaped pintle having a horizontal leg formed with a wood screw thread adapted to be secured in a fixed structure and having an integral vertical leg, and

(b) an elongated secondary element having a wood screw thread at one end adapted to be secured in a swingable structure and having a cylindrical bore adjacent the other end, the bore extending completely through the element and fitting snugly over the vertical leg of the pintle, the said vertical leg of the pintle having an upper portion of



reduced diameter and the bore in the secondary element having a diameter somewhat greater than that of the said upper portion of the vertical leg of the pintle wherein said other end of secondary element has a scribing protuberance formed on and extending coaxially thereof.

4,882,810

APPARATUS FOR REMOVING MEAT FROM A BONE OF A POULTRY LIMB OR THE LIKE

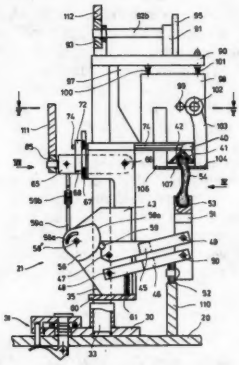
Rüdiger Ostholt, Wetter; Jörg Wahrmann, Sprockhövel, and Klaus Becker, Wetter, all of Fed. Rep. of Germany, assignors to Lohmann Anlagenbau GmbH, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 280,105

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741121; Nov. 11, 1988, 3838236

Int. Cl.[4] A22C *17/04*

U.S. Cl. 17—11 **24 Claims**



1. An apparatus for removing a meat fillet from a bone of a poultry limb having at least one deboning unit, the deboning unit comprising:

retaining means for retaining the limb;

stripping diaphragm means for stripping the bone from the fillet including an aperture having a changeable area during the stripping process;

abutment means for engaging said bone and pushing it through the fillet and out of said fillet;

driving means to move said stripping diaphragm means and said abutment means relative to each other; and

wherein said aperture of said stripping diaphragm means has a diameter slightly larger than that of said bone, said stripping diaphragm being formed by two diaphragm plates non-movable in a deboning direction, one of said diaphragm plates being part of a movably supported dia-

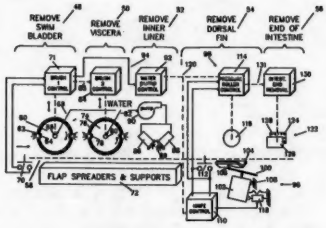
phragm portion adapted to be actuated by a diaphragm actuating means in order to open said diaphragm and to change the area of said diaphragm aperture, said diaphragm plates being movable in unison to a limited extent in the plane of said diaphragm to follow curved portion of said bone.

4,882,811

APPARATUS FOR PROCESSING FISH

Richard C. Ewing, Assonet, Mass., assignor to Baader North America Corporation, New Bedford, Mass.

Division of Ser. No. 920,364, Oct. 20, 1986, Pat. No. 4,761,856.
This application Jun. 20, 1988, Ser. No. 208,661
Int. Cl.[4] A22C *25/14*
U.S. Cl. 17—58 **19 Claims**



1. Apparatus for processing fish, said fish having had its head removed and its belly slit, comprising:

a conveyor;

said conveyor including means for moving said fish along a predetermined path with said belly uppermost;

at least one processing station;

said at least one processing station including a rotating brush;

means for spreading belly flap of said fish to reveal an interior of said belly; and

means for controlling a position of said rotating brush for bringing a perimeter thereof into contact and out of contact with a predetermined portion of said interior, wherein said means for controlling are capable to control said position during the operation of said apparatus, said means of controlling, comprising means for exerting a predetermined hold-down force of said brush, whereby at least a portion of viscera are removed from said interior.

4,882,812

OPENING ROLLER FOR AN OPENING DEVICE OF AN OPEN-END SPINNING MACHINE

Gerhard Fetzer, Süssen, and Eugen Bader, Birenbach, both of Fed. Rep. of Germany, assignors to Fritz Stahlecker and Hans Stahlecker, both of, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 88,973, Aug. 24, 1987, which is a continuation of Ser. No. 731,272, May 7, 1985, abandoned.
This application May 9, 1988, Ser. No. 191,688
Claims priority, application Fed. Rep. of Germany, May 12, 1984, 3417707
Int. Cl.[4] D01B *1/00*; D01G *15/12*; D01H *7/882*
U.S. Cl. 19—112 **2 Claims**

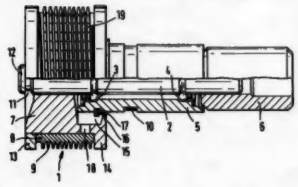
1. An opening roller for an open-end spinning arrangement, comprising:

roller body means,

shaft means connected to said roller body means for rotating said roller body means,

ring mounting means arranged on said roller body means for combing sliver, said ring mounting means having a cylindrical outer surface, said surface of said ring mounting means having a plurality of combing teeth, said teeth being unitary with said outer surface, said teeth being formed by a plurality of circumferential grooves and a plurality of axially extending recesses in said outer surfaces, and

first and second roller collar means mounted on said roller body means at each end for protecting said teeth, said collar means extending radially at least as far as said outer



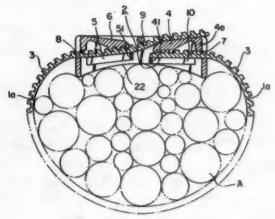
surface of said ring mounting means, at least one of said circumferential grooves being contained in a first plane sloped in a direction toward said first collar means and at least one of said circumferential grooves being contained in a plane sloped in a direction toward said second collar means.

4,882,813

BANDING CLIP

Toshinobu Nakamura, Tokyo, Japan, assignor to Shinagawa Shoko Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 265,095
Claims priority, application Japan, Nov. 18, 1987, 62-175063
Int. Cl.[4] B65D *63/00*
U.S. Cl. 24—16 PB **11 Claims**



1. A banding clip for holding an article with an elongated band having a plurality of teeth on substantially one entire surface thereof, comprising:

first and second side walls which are spaced apart and which extend substantially parallel to each other;

first band engaging means for engaging one end portion of the band, said first band engaging means having a first base portion which extends between the first and second side walls;

first guiding means for guiding said one end portion of the band into engagement with said first band engaging means, said first guiding means comprising at least one projection which projects from at least one of said first and second side walls;

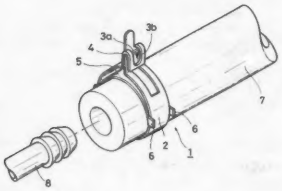
second band engaging means for engaging any portion other than said one end portion of the band, said second band engaging means having a second base portion which extends between the first and second side walls;

second guiding means for guiding said any portion of the band into engagement with said second band engaging means, said second guiding means comprising at least one projection which projects from at least one of said first and second side walls.

4,882,814
HOSE CLAMP FURNISHED WITH TACKING FUNCTION

Yasuo Takahashi, Yokohama, Japan, assignor to Kato Hatsujo Kaisha, Ltd., Kanagawa, Japan

Filed May 3, 1989, Ser. No. 346,937
Claims priority, application Japan, May 20, 1988, 63-65783[U]; Aug. 8, 1988, 63-104125[U]
Int. Cl.[4] F16L *33/22*
U.S. Cl. 24—20 R **3 Claims**



1. A hose clamp furnished with a tacking function, comprising:

a clamp body including an annular clamping ring part for squeezing a hose and a pair of grip parts for filling the role of radially expanding said ring part;

a separately formed holder capable of retaining said pair of grip parts in a state of mutual approximation; and

displacement inhibiting means capable of coming into resilient contact with the peripheral surface of a hose and inhibiting said clamp body from being displaced on the peripheral surface of said hose when said hose is inserted inside said clamping ring part in a radially expanded state.

4,882,815
ARRANGEMENT IN A PURSE OR BAG SECURED AGAINST THEFT

Nilsen, Morten N., Bel Colles Allé 8A, DK-2960 Rungsted Kyst, Denmark

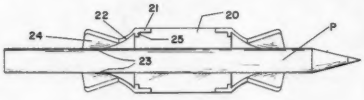
PCT No. PCT/NO87/00062, § 371 Date May 31, 1988, § 102(e) Date May 31, 1988, PCT Pub. No. WO88/02526, PCT Pub. Date Apr. 7, 1988
Continuation of Ser. No. 752,967, Jul. 5, 1985, abandoned. This PCT application Sep. 23, 1987, Ser. No. 201,139
Claims priority, application Norway, Sep. 30, 1986, 863893
Int. Cl.[4] A44B *21/00*; E05C *19/16*
U.S. Cl. 24—303 **3 Claims**

1. In combination with a garment, a valuable article, and means for securing the valuable article inside the garment against theft, said securing means comprising a button-shaped projection secured to the article, and a cup so shaped as to receive and retain said projection, one of said cup and projection being a permanent magnet and the other of said cup and projection being a magnet-affected body, said projection being disposed within said cup with the material of the garment disposed between said projection and the interior of said cup.

4,882,816
RESILIENT RETAINER FOR ELONGATE OBJECTS OF DIFFERENT DIAMETERS AND WIDTHS

Kent D. Murphy, 8 Windermere Gilford Road, Sandymount, Dublin 4, Ireland

Filed Nov. 30, 1988, Ser. No. 277,975
Int. Cl.[4] B43K *23/00*
U.S. Cl. 24—555 **11 Claims**

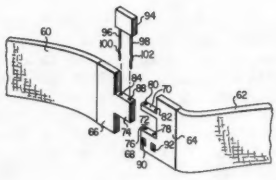


1. A clip type holder device, comprising a back wall, a pair of holding members connected to said back wall and extending outwardly at right angles to said back wall, said pair of holding members spaced from each other and having facing holding surfaces, at least one of said members of said pair of holding members being a flexible resilient member having a free end biased toward the other member of said pair of members and adapted to flex about a connection axis at the opposite end at right angles to said back wall, a flare portion on said one member adjacent the free end thereof, said facing holding surface of said one member being convex and spaced from said back wall and operative to move apart from the facing holding surface of said other member against the biasing force in a directional plane parallel with said back wall when an elongated object having a longitudinal axis at right angles to the connection axis is pressed into the flare portion to a position between said facing holding surfaces to be held therebetween.

4,882,817
LOCKING MECHANISM

Jean-Phillipe Schmid, Chateau Crausaz, CH-1111 Gollion, Switzerland

Filed Apr. 11, 1988, Ser. No. 180,049
Int. Cl.[4] A44B *9/00*
U.S. Cl. 24—707.6 **4 Claims**



1. A locking mechanism for securing two semi-resilient workpieces together, comprising:

first and second cylindrical rods each having a longitudinal axis with a predetermined diameter and each having first and second ends with the first end of each of the first and second cylindrical rods secured to one of the two work pieces;

first and second channels formed in the other of the two workpieces for receiving the second ends of each of said longitudinal rods, respectively, and the portion of the said first and second longitudinal rods not remaining exposed such that the two workpieces substantially abut;

first and second longitudinal members each shaped similar to said cylindrical rod and having a sepertine axis with first and second ends with said first and second ends in the same plane and intersecting said longitudinal axis of the respective one of said first and second cylindrical rods at a point removed a predetermined distance from the distal ends thereof and forming an integral part thereof;

the surface of each of said first and second longitudinal members forming an apex at the farthest most point from the respective longitudinal axis and each of the apexes lying in the plane of said first and second cylindrical rods and in diametrically opposite directions;

said first and second channels having a diameter that is slightly less than the distance between the surface of the respective one of said first and second longitudinal members farthest most from said respective longitudinal axis and the surface of said respective first and second cylindrical rods on the diametrically opposite side of said respective longitudinal axis;

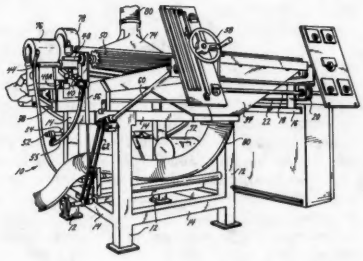
first and second cavities in communication with said first and second channels, respectively, for receiving a respective one of said first and second longitudinal members when the second end of said respective first and second cylindrical rods is fully inserted into said channels, each of said cavities having a surface that is parallel with the axis of said respective first and second channels that is disposed a distance away from said respective longitudinal axis that is greater than the distance of the farthest most surface of said longitudinal member, each of said first and second cavities forming a longitudinal dimension that is slightly larger than the respective one of said first and second longitudinal members to provide relief for said first and second longitudinal members when in said respective first and second cavities.

4,882,818

CARPET SHEARING APPARATUS

John B. Weathers, 544 Dawnville Rd., NE., Dalton, Ga. 30720; Paul B. Mitchell, Jr., 2003 Ravenwood Dr., Collinsville, Ill. 62234; Coy L. Sampson, 800 S. Hamilton St., Dalton, Ga. 30720, and Charles B. Hubbs, P.O. Box 1886, Dalton, Ga. 30722

Filed Nov. 4, 1988, Ser. No. 267,806
Int. Cl.[4] D06C *13/00*
U.S. Cl. 26—15 R **6 Claims**



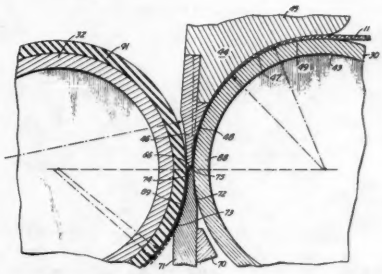
1. A machine for shearing modular pile carpet comprising a frame having a table thereon which is movable between a first position and a second position, means for holding modular carpet on said table, shear means on said frame positioned a predetermined distance above said table whereby the carpet is sheared as the table moves from the first position to the second position, and said shear means including means for raising said shear when said table is moved from the second position to the first position.

4,882,819

METHOD FOR COMPRESSIVELY SHRINKING OF TUBULAR KNITTED FABRICS AND THE LIKE

William D. Milligan, Matthews, N.C., and Andrew P. Cecere, Valley Stream, N.Y., assignors to Compax Corp., Woodside, N.Y.

Continuation of Ser. No. 107,953, Oct. 13, 1987, abandoned. This application Apr. 6, 1989, Ser. No. 334,785
Int. Cl.[4] D06C *21/00*
U.S. Cl. 26—18.6 **8 Claims**



1. A single station process for imparting lengthwise compressive shrinkage to tubular knitted fabrics and the like, which comprises

(a) delivering the fabric in flat form and in moist condition,

(b) defining an arcuate entry path for said fabric, by means of a feeding roller and an arcuately contoured confining shoe,

(c) advancing the fabric through said entry path in a controlled manner by contacting one surface of said fabric with said feeding roller while closely confining the opposite surface of the fabric, under limited controlled pressure, by said confining shoe,

(d) yieldably urging said confining shoe towards said feeding roller under low pneumatic pressure during feeding of said fabric,

(e) defining a short confinement zone for said fabric by means of opposed surfaces of said confining shoe and an exit shoe,

(f) said confinement zone being of short length, in the order of a small fraction of an inch, while being of greater length than the thickness of the fabric,

(g) the entry end of the said zone being positioned closely adjacent the surface of said feeding roller and being disposed at angle to the exit end of said entry path of between 30 and 60 degrees,

(h) causing the fabric to be abruptly diverted from said entry path out of contact with said feeding roller and into said confinement zone and to travel through said confinement zone under limited confining pressure,

(i) adjustably controlling the confinement pressure in said zone by positioning said confining shoe with respect to said exit shoe such that the confinement pressure is not substantially greater than necessary to avoid creping of the fabric,

(j) defining an arcuate exit path for said fabric, offset from said entry path, by means of a retarding roller and an arcuately contoured surface of said exit shoe,

(k) the entry end of said arcuate exit path being joined with the exit end of said confinement path and being disposed at a sharp angle thereto,

(l) yieldably confining said fabric in said exit path by urging said retarding roller toward said exit shoe under controlled fluid pressure,

(m) causing said feeding and retarding rollers to be controllably driven in such manner that the surface speed of the

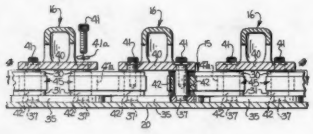
feeding roller is controllably greater than the surface speed of the retarding roller.

4,882,820

TENTER FRAME CHAIN WITH LOW FRICTION SLIDE BLOCK

Francis X. MacKinnon, N. Scituate; James F. Horn, Cranston, and John A. Pastina, Warwick, all of R.I., assignors to Gessner Industries, Inc., Charlotte, N.C.

Filed Mar. 21, 1989, Ser. No. 326,523
Int. Cl.[4] D06C *3/02*
U.S. Cl. 26—93 **17 Claims**



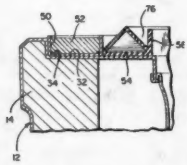
1. A tenter frame for transporting sheet material under tension in an open width condition along a longitudinal path of travel, said tenter frame comprising a pair of elongate guide rails extending along opposite sides of the longitudinal path of travel of the sheet material, each of said guide rails having a vertically disposed bearing surface extending along the corresponding sides of the longitudinal path of travel of the sheet material, an endless tenter chain supported for movement in each of said guide rails with portions of the chain bearing against said vertically disposed bearing surface of said guide rail, and tenter clip means supported on said chain for engaging opposite sides of the sheet material, said tenter chain comprising a plurality of links, each link including upper and lower interconnected loadbearing plates and a slide block sandwiched between said loadbearing plates and having a vertically disposed bearing surface located laterally outwardly beyond the lateral extent of said loadbearing plates for contacting said vertically disposed bearing surface of said guide rail while maintaining other portions of the tenter chain spaced out of contact with the bearing surface of the said guide rail.

4,882,821

MAGNETIC CASKET SEAL ASSEMBLY

John W. Sims, Jr., San Antonio, Tex., assignor to Magna-Seal, Inc., San Antonio, Tex.

Filed May 18, 1988, Ser. No. 195,148
Int. Cl.[4] A01N *1/00*
U.S. Cl. 27—17 **9 Claims**



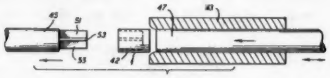
1. A casket incorporating a horizontally elongated, upwardly opening base having upstanding opposite side and end walls terminating upwardly in a first peripherally continuous and upwardly facing surface including inner and outer marginal areas, a cover assembly for said base incorporating a pair of opposite head and foot end cover sections pivotally supported from said base for independent swinging movement relative thereto between open upwardly projecting positions and closed horizontal positions overlying said base and closing the latter from above, said cover sections, when in said closed positions, including second downwardly facing peripheral surfaces closely overlying and extending along said first surface and closely horizontally opposing marginal portions extending across said base between corresponding opposite side portions of said first surface, said first and second surfaces including first seal means disposed therebetween and extending thereabout operative to form a fluid tight seal between said first and second peripheral surfaces when said covers are in said closed positions, said opposing marginal portions including third vertically opposing seal surfaces extending therealong and second seal means disposed therebetween operative to form a fluid tight seal between said third surfaces when said covers are in said closed positions and also coacting with said first seal means to form a fluid tight seal therewith at the opposite ends of said third seal surfaces when said covers are in said closed positions, said first seal means extending along the inner marginal area of said first surface, said outer marginal area of said first surface including at least substantially peripherally continuous upwardly facing magnet means supported therefrom, said second downwardly facing peripheral surfaces being constructed of ferrous material for magnetic attraction thereof to said magnet means, said first seal means including inner and outer peripheral portions, one of said peripheral portions being defined by a hollow triangular resilient sealing strip portion including a horizontal base and an uppermost apex portion and the other peripheral portion is defined by an upstanding curb portion formed integrally with one end of said base portion, said apex portion projecting upwardly to an elevation spaced slightly above the uppermost extremity of said curb portion.

4,882,822

METHOD OF FABRICATION OF A BULLET HAVING SECTIONS SEPARABLE UPON IMPACT

Thomas J. Burczynski, P.O. Box 248, 107 Main St., Odessa, N.Y. 14869

Division of Ser. No. 140,587, Jan. 4, 1988. This application Nov. 18, 1988, Ser. No. 272,946
Int. Cl.[4] B21K *21/06*
U.S. Cl. 29—1.22 **8 Claims**



1. The method of fabricating a bullet from a substantially cylindrical body of malleable material having front and back ends, said method comprising the steps of:

(a) placing said body within a cylindrical die cavity having a diameter substantially equal to, and a length at least as great as, the respective diameter and length of said body;

(b) relatively moving said body and a splitting punch to force said punch axially into said body while circumferentially restraining said body within said cavity, said punch including at least three, substantially planar arms extending outwardly from a common central axis and terminating at distances from said common axis less than the radius of said cylidnrical body, thereby forming a number of parting lines within said body, corresponding to the number of said arms, said punch central axis being aligned with the longitudinal axis of said body and said punch moving into said body from said front end thereof for a predetermined distance not exceeding $\frac{1}{2}$ of the axial length of said body;

(c) withdrawing said punch from said body, leaving a plurality of pairs of opposing surfaces within said body on opposite sides of each of said parting lines; and

(d) compressing said body radially inwardly over substantially its entire length, with said body remaining in the cylindrical configuration for a first portion of the axial length thereof forwardly from said back end and tapering inwardly for a second portion of said axial length from

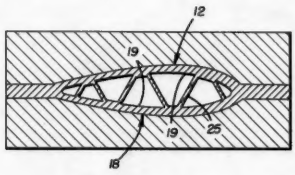
said first portion to said front end, said predetermined distance being greater than said second portions axial length, said compressing substantially eliminating all air space from between said opposing surfaces and bringing each pair thereof into intimate contact along said parting lines while remaining physically unattached.

4,882,823

SUPERPLASTIC FORMING DIFFUSION BONDING PROCESS

Edward D. Weisert; John R. Fischer, both of San Carlos, and William L. McCauley, Dublin, all of Calif., assignors to Ontario Technologies Corp., Menlo Park, Calif.

Filed Jan. 27, 1988, Ser. No. 149,216
Int. Cl.[4] B23K *31/02*
U.S. Cl. 29—6.1 **20 Claims**



1. A method of forming a hollow structure having a varying mass distribution, comprising:

forming a first unitary sheet of a diffusion bondable and superplastically formable material with one flat surface and an opposite surface contoured to have a first selected non-uniform mass distribution;

forming a second sheet of a superplastically formable material that is diffusion bondable to said first sheet with one flat surface and an opposite surface contoured to have a second selected mass distribution, said first and second mass distributions being such as to provide said varying mass distribution for said hollow structure;

positioning each of said flat surfaces in abutting relation to a respective one of one another and a respective one of a pair of oppositely facing flat surfaces of an intermediate flat core sheet formed of a material that is diffusion bondable to said first and second sheets and with a stop-off material between selected non-peripheral portions of each of abutting said flat surfaces whereat diffusion bonding is to be prevented and superplastic forming is to be required;

subjecting said sheets to diffusion bonding conditions to thereby bond said flat surfaces to one another or to said core sheet other than where said stop-off material was applied to form a diffusion bonded sandwich; and

subjecting said sheets to superplastic forming conditions and thereby expanding said sheets apart against a die.

4,882,824

APPARATUS FOR INSTALLING SLIDERS ON A GAPPED SLIDE FASTENER CHAIN

Walter H. Dziura, Bethlehem; Angelo Fusco, Waterbury, both of Conn., and Parviz Khosravi, Gainesville, Ga., assignors to Scovill Fasteners Inc., New York, N.Y.

Filed Jul. 5, 1988, Ser. No. 215,386
Int. Cl.[4] B21D *53/67*; A44B *19/41*
U.S. Cl. 29—33.2 **5 Claims**

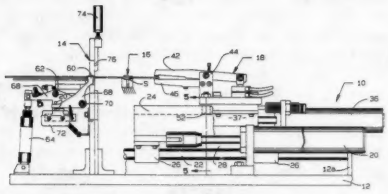
1. An apparatus for installing sliders on a gapped slide fastener chain drawn from a supply source along a work path comprising:

a. cutting means in the workpath adapted to cut off the chain in the gapped zone to form a new leading end,

b. slider clamping means adjusted to clampingly hold sliders one by one in the workpath after the cutting means,

c. fastener chain drive means for advancing the chain including a platform mounting two pairs of jaws, the pairs of jaws adapted to close on the new leading ends of the stringers of the chain respectively, spread them and feed them into the wider end of a slider clamped in the clamping means, and advance the slide fastener chain along the workpath,

d. a finger disposed on the workpath before the cutting means and when activated adapted to press against the teeth of the chain as the chain advanced and move into the



gap in the chain when the gap arrives at the location of the finger, the finger then engaging the trailing end of the gap and arresting the forward movement of the chain and activating the cutting means,

e. finger moving means for retracting the finger after the slide fastener has been cut by the cutting means,

f. force-reducing means for reducing the force with which the drive means advances the fastener chain, and

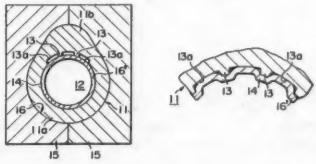
g. sensing means sensing the arrival of the new leading end of the chain at a given point on the workpath, the sensing means causing the finger to press against the teeth and activating the force-reducing means on the drive means.

4,882,825

METHOD OF CONNECTING A TUBULAR MEMBER WITH AN ANNULAR MEMBER

Masanobu Nakamura, Kamakura, Japan, assignor to Kokan Kako Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 812,242, Dec. 23, 1985, abandoned, which is a continuation-in-part of Ser. No. 532.315, Sep. 15, 1983, abandoned. This application Oct. 28, 1987, Ser. No. 114,831
Claims priority, application Japan, Jan. 14, 1983, 58-3548; Feb. 8, 1983, 58-18180
Int. Cl.[4] B23P *15/00*
U.S. Cl. 29—156.4 R **1 Claim**



1. A method of connecting a tubular member with a cam member, for manufacturing a camshaft thereby, comprising the steps of:

fitting said tubular member into a central bore in said cam member, the inner circumference of the cam member being provided with axially extending grooves defining substantially flat bottom ridges and substantially flat bottom valleys located only in the lobe part of the inner circumference of the cam member corresponding to the

part of the inner circumference of the cam member corresponding to the part of the cam member with the greatest wall thickness, so that the inner circumference is not smooth, the width of the grooves being no less than 1.5 times the wall thickness of the tubular member and being substantially rectangular in cross section;

placing said cam member in a bulge mold; supplying a working fluid into the interior of said tubular member and applying sufficient pressure to the working fluid to forcibly expand the tubular member in an area adjacent the thickest lobe part of the wall of the cam member so that at the outer circumference of the tubular member is deformed in said area and engaged into said valleys so as to form corresponding blunt projections on the outer circumference of the tubular member, so that the outer circumference is not smooth, without substantially reducing its wall thickness; and

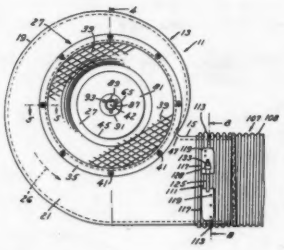
terminating said application of pressure to the working fluid when said projections on the outer circumference of the tubular member are sufficiently engaged into said grooves to mechanically lock both members together, such termination of pressure being before the tubular member is completely deformed along the shape of the grooves so as to leave some clearance between the inner wall of the grooves and the expanded outer circumference of the tubular member.

4,882,826

METHOD OF MAKING A UNIT BLOWER HOUSING

James A. Belanger; Robert J. Wentworth, both of Northville; Barry S. Turner, Livonia, and Graham J. Astley, Novi, all of Mich., assignors to Belanger, Inc., Northville, Mich.

Division of Ser. No. 45,331, May 4, 1987, Pat. No. 4,799,287.
This application Oct. 31, 1988, Ser. No. 264,647
Int. Cl.[4] B21B *1/46*
U.S. Cl. 29—527.1 **5 Claims**



1. The method of making a unit blower housing of molded plastic material having a tangential outlet comprising:

(a) taking a mold which when closed has an internal cavity corresponding to the outer configuration of the unit blower housing; and

(b) placing powdered or granular plastic material into said mold when open;

(c) closing the mold;

(d) subjecting the mold to heat to melt the plastic while rotationally rotating said mold to fill said cavity with the melted plastic material;

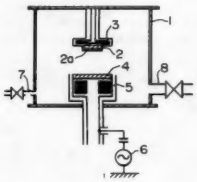
(e) and cooling the mold to solidify the plastic and to thereby form the unit blower housing with tangential outlet.

4,882,827

PROCESS FOR PRODUCING GLASS MOLD

Yasuo Kusumi, Akishima; Ken Uno, Bunkyo, and Takuo Fujino, Akishima, all of Japan, assignors to Hoya Corporation, Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,499
Claims priority, application Japan, Sep. 28, 1987, 62-243009
Int. Cl.[4] B23P *17/00*
U.S. Cl. 29—527.2 **6 Claims**



1. A process for producing a glass mold, said process comprising the steps of:

(a) processing a material for a base having a surface for a glass mold to be produced into a mold base having a shape corresponding to that of a molded glass article to be produced from the mold;

(b) forming a β-SiC having (111) plane orientation on the surface of the mold base according to a chemical vapor deposition (CVD) method; and

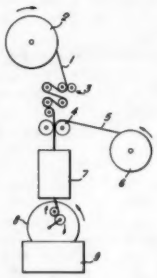
(c) forming a hard carbon film on the mold base according to a sputtering method using an inert gas and graphite as a target at a mold base temperature of 250°–450° C.

4,882,828

PROTECTION OF SENSITIVE MATERIAL

Robert H. McLoughlin; George B. Park, both of Swindon; John Cook, Faringdon, all of United Kingdom, and Stephen E. Myers, San Carlos, Calif., assignors to Scimat Limited, United Kingdom

Continuation of Ser. No. 210,142, Jun. 15, 1988, abandoned, which is a continuation of Ser. No. 618,092, Jun. 7, 1984, abandoned. This application May 5, 1989, Ser. No. 349,888
Claims priority, application United Kingdom, Nov. 2, 1983, 8329210; Dec. 15, 1983, 8333386
Int. Cl.[4] H01M *4/04*
U.S. Cl. 29—623.1 **5 Claims**



1. A method of making a protected electrode, which comprises:

(a) providing a body of a reactive metal which is capable of functioning as an electrode in an electrochemical device, at least part of the body being protected by a layer of fluid impermeable polymeric material; and

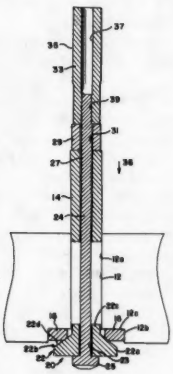
(b) stretching the layer of polymeric material, and the body of reactive metal while protected by the polymeric material, so that (i) the thickness of the body of reactivated metal is reduced significantly, and (ii) the fluid permeability of the polymeric material is increased sufficiently to allow it to function as an electrode separator in an electrochemical device, without significant alteration of its composition.

4,882,829

DEVICE FOR ACCURATELY POSITIONING AND ALIGNING A GUIDE SLEEVE INTO A BORE OF A CYLINDER HEAD

Peter H. Dawe, 215 Springbrook, Sparta, N.J. 07871

Continuation-in-part of Ser. No. 235,687, Aug. 23, 1988. This application Mar. 9, 1989, Ser. No. 320,977
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—251 4 Claims



1. For use with a cylinder head having a plurality of bores, a guide sleeve received tightly in each bore, a valve having a valve head and a valve stem insertable through each guide sleeve, and a valve seat for seating each valve head, a device for accurately positioning and automatically aligning correctly each guide sleeve within a respective bore, comprising:

(a) a base having a lower surface and an upper inclined aligning surface for accurately and automatically aligning said valve seat thereon during forcible insertion of said guide sleeve into the respective bore, said base having a bore extending therethrough;

(b) a guide rod extending through said bore of said base for insertion into a bore of the cylinder head for automatically and accurately guiding said guide sleeve which is force fit into the respective bore of the cylinder head, said guide rod having an enlarged head at a lower end thereof with a non-circular outer gripping surface, and screw threads at an upper end thereof; and

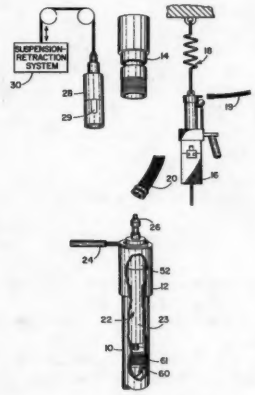
(c) driver means for driving said guide sleeve into the respective bore of the cylinder head, said drive means including an internal bore with screw threads which threadedly engage the screw threads of the guide rod, and a non-circular outer gripping surface.

4,882,830

METHOD FOR IMPROVING THE INTEGRITY OF COUPLING SECTIONS IN HIGH PERFORMANCE TUBING AND CASING

Kenneth J. Carstensen, 4540 No. 44th St., No. 70, Phoenix, Ariz. 85018

Division of Ser. No. 105,339, Oct. 7, 1987. This application Feb. 3, 1989, Ser. No. 305,558
Int. Cl.[4] B21D *39/00*
U.S. Cl. 29—421.1 6 Claims



1. The method of filling the area between opposed nose ends of tubing within a collar for oil field applications, comprising the steps of:

making up a connection with a collar threaded onto an upper end of a tubing section;

inserting a cylindrical member through the collar into the upper end of the tubing section;

retaining the member to an inner surface of the tubing section below the upper end thereof, the member having an outer diameter slightly less than an inner diameter of the tubing section and more than spanning a gap between opposed tubing sections in the collar;

filling the gap between an outer surface of the member and the inner surface of the collar with an amount of a catalyzed resin having a predetermined cure time;

threading a section of tubing section inwardly into the collar while the resin is still not cured, the amount of resin being sufficient to completely fill a volume within the collar between the nose ends of the opposed tubing sections; and

removing the member when the resin has sufficiently solidified.

4,882,831

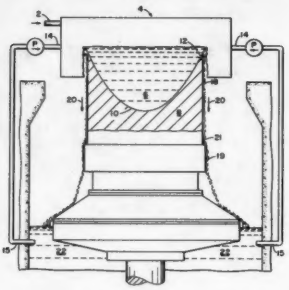
METHOD OF PRODUCING AIRCRAFT PLATE AND SHEET

John E. Jacoby; Ho Yu, both of Murrysville, and Robert A. Ramser, New Kensington, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation of Ser. No. 941,810, Dec. 15, 1986, Pat. No. 4,724,887, which is a continuation of Ser. No. 850,488, Apr. 11, 1986, Pat. No. 4,709,740, which is a continuation of Ser. No. 550,466, Nov. 10, 1983, Pat. No. 4,610,295. This application Dec. 28, 1987, Ser. No. 138,392
The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.
Int. Cl.[4] B23P *17/00*
U.S. Cl. 29—527.5 3 Claims

1. A method for producing aircraft plate or sheet comprising:

(a) producing lithium-containing light metal alloy ingot by continuous casting with organic coolant; and



(b) rolling, extruding, or forging said ingot into aircraft plate or sheet.

4,882,832

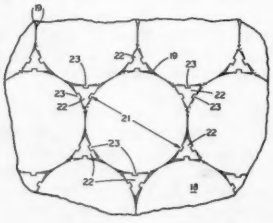
METHOD OF MANUFACTURING ELECTRIC MOTOR STATOR STRUCTURE

John G. Lewis, St. Louis, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 10,180, Feb. 2, 1987, Pat. No. 4,801,831. This application Nov. 7, 1988, Ser. No. 268,008

Int. Cl.[4] H02K *15/02*

U.S. Cl. 29—596 **6 Claims**



1. A method for manufacturing laminations of a stator core for an electric motor comprising:

forming a pattern on a sheet of preselected material from which stator core laminations are to be separated, said pattern including at least two abutting rows of abutting circles each preselectively sized to defined the active material diameter and confine the main body of a core lamination with adjacent rows of abutting circles being staggered so that peripheries of adjacent rows of circles substantially dovetail in spaces defined between opposed mirror image arcs of adjacent circles in an adjacent row with peripheries of circles of one row abutting peripheries of two adjacent circles of an adjacent row of circles to maximize material usage on said sheets with said abutting circles including peripheral tab portions integral therewith to extend from the peripheries thereof into the material between circles;

separating laminations of preselected shape form the confines of said circles and integral tab portions defining the active material diameter of said laminations; and,

stacking a preselected number of separated laminations with said integral tab portions in stacked alignment to provide tongues cooperatively insertable into opposed slotted support members to form the basic core of a stator.

4,882,833

METHOD AND APPARATUS FOR MOUNTING COILS INSIDE A HOLLOW CYLINDRICAL ARTICLE

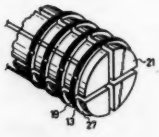
Hiromichi Hiramatsu; Hitoshi Odashima, both of Yokohama; Kuniaki Hirayama, Katsuta, and Toshio Ohji, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,662

Claims priority, application Japan, May 13, 1987, 62-114565

Int. Cl.[4] H02K *15/00*

U.S. Cl. 29—596 **18 Claims**



1. A method for mounting coils to the inner periphery of a hollow cylindrical article, comprising the steps of:

providing means for holding and expanding a coil, said holding and expanding means having a substantially circular outer surface and having means for opening and closing in a radial direction so as to increase the diameter of said circular outer surface;

winding a wire around said circular outer surface to form a coil of substantially circular shape having a first outer diameter;

inserting said coil holding and expanding means into the hollow cylindrical article with the coil formed thereon; and

expanding the coil formed around the circular outer surface by opening said coil holding and expanding means in the radial direction so that the diameter of the coil holding and expanding means is increased to be substantially equivalent to the inner periphery of the hollow cylindrical article and the coil undergoes an elongation and a plastic deformation to expand the size of the coil to a second coil outer diameter that is greater in diameter than said first coil outer diameter, and mounting the expanded coil of the second coil outer diameter to the inner periphery of the hollow cylindrical article.

4,882,834

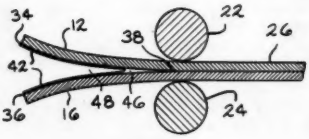
FORMING A LAMINATE BY APPLYING PRESSURE TO REMOVE EXCESS SEALING LIQUID BETWEEN FACING SURFACES LAMINATIONS

Jerry W. Schoen, Hamilton, Ohio, assignor to Armco Advanced Materials Corporation, Lydora, Pa.

Filed Apr. 27, 1987, Ser. No. 43,077

Int. Cl.[4] H01F *7/06;* **B32B** *31/08, 31/12*

U.S. Cl. 29—605 **16 Claims**



1. A method of forming a laminate comprising the steps of:

providing at least two laminations,

each said lamination having a facing surface,

applying a liquid to one of said facing surfaces,

said liquid having a viscosity no greater than about 80 cP at 24° C.

applying pressure to said laminations to remove excess liquid between said surfaces as said surfaces are brought into contact with each other whereby air between said surfaces is displaced and said liquid forms a seal to prevent reentry of said air.

4,882,835

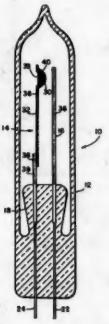
METHOD OF MAKING GLOW DISCHARGE STARTER

Nikolaos Barakitis, Salem, and Gregory Zaslavsky, Brookline, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Division of Ser. No. 156,123, Feb. 16, 1988, Pat. No. 4,843,282. This application Jun. 19, 1989, Ser. No. 352,232

Int. Cl.[4] H01J *7/30*; H05B *41/08*

U.S. Cl. 29—622 **3 Claims**



1. The method of making a glow discharge starter comprising the steps of providing an envelope, forming a bimetallic electrode with a bimetallic element, providing a counter electrode, completely covering said electrodes with a silver plating, sealing said bimetallic electrode and said counter electrode within said envelope, exhausting said envelope, filling said envelope with a gas at a predetermined pressure, and hermetically sealing said envelope.

4,882,836

PRECISION AUTOMATIC ASSEMBLY APPARATUS INCLUDING AIR CORE COILS AND CORRESPONDING MAGNETIC POLES

Toshiro Higuchi, Yokohama, Japan, assignor to Research Development Corporation, Tokyo, Japan

Division of Ser. No. 37,919, Apr. 13, 1987. This application Apr. 22, 1988, Ser. No. 184,744

Claims priority, application Japan, Feb. 20, 1987, 62-35901; Feb. 20, 1987, 62-35902

Int. Cl.[4] B25J *11/00*

U.S. Cl. 29—719 **5 Claims**

1. A precision automatic assembly apparatus for inserting an insertable part into a hole formed in a member, comprising:

(a) a movable hand;

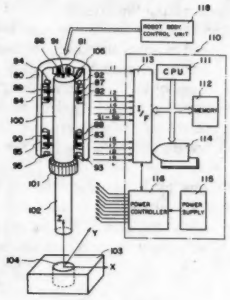
(b) a movable body incorporated in said hand;

(c) an electromagnetic-type wrist mechanism having a plurality of electromagnetic devices for supporting said movable body and controlling said movable body along a plurality of axes, each of said electromagnetic devices comprising a linear DC actuator having an air-core coil and a magnetic pole corresponding thereto;

(d) a position detector for detecting the position of said movable body;

(e) said insertable part being mounted on an end portion of said movable body;

(f) means for determining the external force which acts upon said insertable part in a position at which ssaid insertable part contacts said member based on an output signal from said position detector inputted to said determining means and current values of excitation coils of said electromagnetic devices inputted to said determining means and for determining the absence of said external force when said



insertable part is aligned with and inserted into said hole; and

(g) means for adjusting the position of said insertable part relative to said hole based on an output signal from said determining means until said insertable part and said hole are in alignment and said part is inserted in said hole.

4,882,837

PRECISION AUTOMATIC ASSEMBLY APPARATUS INCLUDING FACE TO FACE MAGNETS AND AN AIR CORE COIL THEREBETWEEN

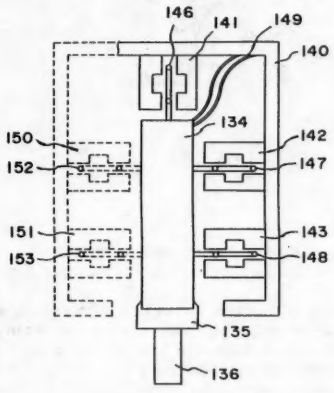
Toshiro Higuchi, Yokohama, Japan, assignor to Research Development Corporation, Tokyo, Japan

Division of Ser. No. 37,919, Apr. 13, 1987. This application Apr. 22, 1988, Ser. No. 185,019

Claims priority, application Japan, Feb. 20, 1987, 62-35901; Feb. 20, 1987, 62-35902

Int. Cl.[4] B25J *11/00*

U.S. Cl. 29—719 **5 Claims**



1. A precision automatic assembly apparatus for inserting an insertable part into a hole formed in a member, comprising:

(a) a movable hand;

(b) a movable body incorporated in said hand;

(c) an electromagnetic-type wrist mechanism having a plurality of electromagnetic devices for supporting said movable body and controlling said movable body along a

plurality of axes, each of said electromagnetic devices comprising a pair of fixed face-to-face magnets with a rectangular air-core coil therebetween;

(d) a position detector for detecting the position of said movable body;

(e) said insertable part being mounted on an end portion of said movable body;

(f) means for determining the external force which acts upon said insertable part in a position at which said insertable part contacts said member based on an output signal from said position detector inputted to said determining means and current values of excitation coils of said electromagnetic devices inputted to said determining means and for determining the absence of said external force when said insertable part is aligned with and inserted into said hole; and

(g) means for adjusting the position of said insertable part relative to said hole based on an output signal from said determining means until said insertable part and said hole are in alignment and said part is inserted in said hole.

4,882,838

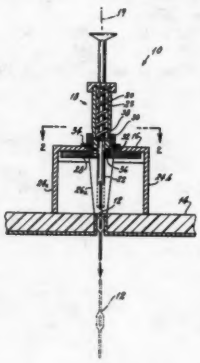
COMPONENT REMOVAL METHOD

Gerald M. Jones, Titusville, and Rhonda L. Nemcovsky, Warren, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Division of Ser. No. 319,388, Mar. 3, 1989, Pat. No. 4,872,259. This application Jun. 23, 1989, Ser. No. 370,489

Int. Cl.[4] H05K *3/30*

U.S. Cl. 29—829 **1 Claim**



1. A method of removing friction-fitted, axially aligned electrical components from a printed circuit board comprising the steps of:

positioning on said board a component removal apparatus, said apparatus having a base, a component removal tool mounted on said base and first and second pairs of legs mounted with said base, one pair of which is rotatably adjustable relative to the other;

positioning said legs on ssid board in a manner to avoid interference with adjacent components while aligning said tool with said component to be removed, said aligning including rotating said one pair of legs relative to said other pair of legs; and

actuating said tool while so aligned to engage said component and drive it from said board.

4,882,839

METHOD OF MANUFACTURING MULTI-LAYERED WIRING SUBSTRATE

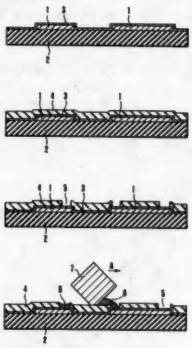
Yoshitsugu Okada, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 18, 1989, Ser. No. 339,718

Claims priority, application Japan, Apr. 22, 1988, 63-100833

Int. Cl.[4] H05K *3/06, 3/28, 3/46*

U.S. Cl. 29—853 **1 Claim**



1. A method of manufacturing a multi-layered wiring substrate, comprising:

the first step of forming a palladium thin film on an entire surface of a substrate including a conductor wiring layer;

the second step of masking a portion except for a predetermined via formation portion on said palladium thin film by a first photoresist;

the third step of embedding a polyimide-based conductive resin in said via formation portion through said first photoresist;

the fourth step of removing said first photoresist;

the fifth step of masking said conductor wiring layer and said via formation portion by a second photoresist;

the sixth step of etching said exposed palladium thin film;

the seventh step of removing said second photoresist;

the eighth step of curing said conductive resin; and

the ninth step of applying a photosensitive polyimide resin to an entire surface of said substrate, forming a via-hole in said via formation portion, and thereafter curing the photosensitive polymide resin.

4,882,840

DRY-SHAVING APPARATUS

Eduard W. Tietjens, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Aug. 1, 1988, Ser. No. 226,564

Claims priority, application Netherlands, Apr. 8, 1986, 8600878

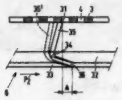
The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.

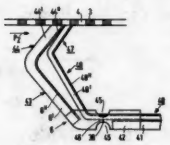
Int. Cl.[4] B26B *19/04*

U.S. Cl. 30—43.6 **13 Claims**

10. A dry-shaving apparatus comprising an external shear member formed with hair-entry apertures and an associated internal shear member rotatably drivable relative to the external shear member; said internal shear member including at least one hair-severing cutter with a cutting edge effective to sever a hair in cooperation with the external shear member, a carrier having an upper side and an underside and with one or more openings in which one or more of said cutters are disposed, said cutters being loaded by parts of a resilient body secured to the underside of said carrier, and the upper side of said carrier

having a resilient element which acts between the carrier and the cutter, at least a part of said cutter being movable against





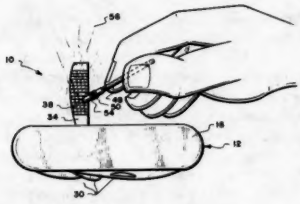
the action of said resilient element in a direction substantially opposed to the direction of driving the internal shear member.

4,882,841

SPARK PRODUCER IN CONJUNCTION WITH A KNIFE

Peter I. Margolis, 1546 El Dorado Dr., Thousand Oaks, Calif. 91362

Filed Feb. 15, 1989, Ser. No. 310,856
Int. Cl.[4] B25F *3/00*
U.S. Cl. 30—125 4 Claims



1. In combination with a knife, said knife having a housing, said housing being capable of functioning as a graspable handle, spark producing means mounted in conjunction with said handle, said spark producing means comprising:

a flint rod assembly, said flint rod assembly including a flint;

a storage chamber, said flint rod assembly being connectable with said storage chamber, said flint rod assembly being substantially totally confineable with said storage chamber, said flint rod assembly being removable from said storage chamber;

a striking surface carried by said handle, said flint to be manually moved against said striking surface to produce a spark which is utilized to start a fire;

said flint rod assembly including a carrier rod, said flint being mounted within said carrier rod; and

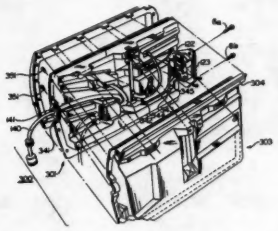
said carrier rod having an inner edge, said inner edge being threaded, said carrier rod to be threadably secured to said storage chamber when said carrier rod is totally confined within said storage chamber.

4,882,842

METHOD OF SIMPLIFYING ON-LINE ASSEMBLY OF VEHICULAR DOOR COMPONENTS

Rochford R. Basson, Ann Arbor; David V. Tinder, Dearborn, and George A. Wooldridge, Warren, all of Mich., assignors to United Technologies Automotive, Inc, Dearborn, Mich.

Filed Sep. 15, 1987, Ser. No. 97,555
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—857 22 Claims



1. A method of simplifying an on-line assembly of door components of a motor vehicle to make a completely assembled door in a main assembly line at a main assembly site for the motor vehicle, comprising the following steps:

(a) manufacturing in a preassembly line operation a modular trim panel door assembly unit at at least one site removed from the main assembly line site for the motor vehicle, including the sub-steps of

molding at least one panel layer having an innermost side and an outermost side, forming therein on the innermost side of said panel layer a series of cavities and walls;

providing on the outermost side of said panel layer a finished, trim layer; and

mounting and attaching a number of electrical and mechanical elements for the door onto the molded panel layer within said molded cavities and adjacent to at least one of said walls, using said cavities and said walls to position and hold adjacent ones of said elements within said cavities and said walls; forming said modular trim panel door assembly unit; and

(b) thereafter, forwarding said modular trim panel door assembly unit to a different site for the unit to be attached to a vehicular door frame including an exterior door panel of a motor vehicle to make a completely assembled door for the vehicle in the main assembly line.

4,882,843

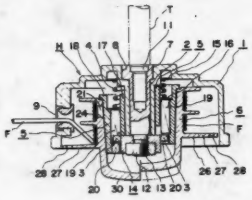
STRUCTURE OF A HEAD OF A FLEXIBLE FILAMENT TYPE GRASS TRIMMER

Toru Baba, Yokosuka, Japan, assignor to Kioritz Corporation, Tokyo, Japan

Filed Jun. 6, 1988, Ser. No. 203,478
Claims priority, application Japan, Jun. 11, 1987, 62-90258[U]
Int. Cl.[4] A01D *50/00*
U.S. Cl. 30—276 4 Claims

1. A flexible cord grass trimmer having a head comprising a housing, a drive shaft fixed to said housing for conjoint rotation, a spool disposed about said shaft on the outer surface of which is wound at least one cord, and a spool support slidably mounted over said drive shaft and interposed between said drive shaft and the inner surface of said spool, said spool support comprising an inner cylindrical member slidably disposed about said drive shaft, an outer cylindrical member spaced concentrically therefrom and integrally connected thereto, at least one L-shaped slot uniformly arranged in the inner surface of said spool opening out of the upper edge thereof and radially extending projections on the exterior surface of said spool support adapted to be received in said slots respectively, spring means biasing said spool support into releasable engagement

with said spool, and means cooperating to cause selective engagement of said spool support and said drive shaft to provide conjoint rotation of said spool support in response to the rotation of said drive shaft and for overcoming said bias and release said spool support from engagement with said spool on movement of said spool axially relative to the drive shaft to



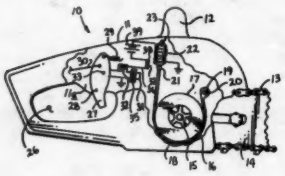
permit said flexible cords to be played out from said spool, said inner and outer cylindrical members of said spool support are connected by two sets of pawls and said drive shaft is provided with cooperating pawls which are engageable and disengageable in response to the movement of spool relative to said drive shaft.

4,882,844

CHAIN SAW SAFETY BRAKE APPARATUS

Michael Stokan, Star Route West, Anaconda, Mont. 58711

Filed Dec. 5, 1988, Ser. No. 279,491
Int. Cl.[4] B27B *17/00*
U.S. Cl. 30—381 **3 Claims**



1. A chain saw safety brake apparatus comprising, in combination,

a chain saw including a housing and a cutting chain extending forwardly of said housing and rearwardly secured about a forwardly extending stationary bar, and

a rotatable rear sprocket contained within said housing, said rear sprocket fixedly secured to a brake drum, and

flaccid brake band overlying a substantial surface of said brake drum, said brake band secured to said housing at one end of said band and secured to an actuating means at a second end of said band wherein said actuating means is completely contained within said housing, and

wherein said actuating means comprises an electrically actuatable solenoid, and

wherein said housing is formed with an opening therethrough and a trigger switch is pivotally mounted within said housing extending downwardly into said opening, and said trigger switch includes an elongate link pivotally secured to said trigger switch, and said link includes a first contact portion secured to said link, and said first contact portion cooperates with a second contact portion wherein contiguous contact of said first contact portion with said second contact portion effects actuation of said solenoid means to tighten said band about said brake drum to arrest movement of said cutting chain, and

wherein said trigger switch includes a "U" shaped recess to accept said elongate link therein, and said elongate linke is pivotally connected within said "U" shaped recess including an elongate pivot pin extending through said trigger switch and said elongate link, and

wherein said elongate link is secured to said trigger switch at one end, and is slidably mounted within a surrounding bushing adjacent its other end to maintain alignment of said elongate link and said first contact portion, and

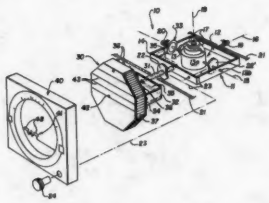
wherein said elongate link includes a raised central portion, and said raised central portion has secured thereto a plurality of arms extending parallel to said elongate link forwardly thereof, and said first contact portion is secured at forwardmost ends of said arms.

4,882,845

GYROSCOPIC ARTIFICIAL HORIZON

Francis Boyer, Yvelines, France, assignor to Societe Francaise d'Equipements pour la Navigation Aerienne S.F.E.N.A., Villacoublay, France

Continuation of Ser. No. 77,679, Jul. 22, 1987, abandoned. This application Sep. 28, 1988, Ser. No. 251,374
Claims priority, application France, Jul. 25, 1986, 86 10804
Int. Cl.[4] G01C *19/38*
U.S. Cl. 33—328 **11 Claims**



1. Gyroscopic artificial horizon comprising a gimbal mount mounted in a support structure, a gyroscope suspended in said gimbal mount, said gimbal mount having an outer frame adapted to rotate about a first axis and an inner frame adapted to rotate relative to said outer frame about a second axis orthogonal to said first axis, a luminous display screen rotationally coupled to said outer frame for displaying an angular position of said outer frame relative to said support structure, a sensor disposed either on the inner or the outer frame for sensing the angular position of said inner frame relative to said outer frame, and a processor adapted to drive said luminous display screen to show said angular position of said inner frame relative to said outer frame as an artificial horizon.

4,882,846

STAIR BUILDING TEMPLATE AND METHOD OF USE

Philip Reed, 818 Ida Ave. #4, Solana Beach, Calif. 92075

Filed Jul. 12, 1988, Ser. No. 217,633
Int. Cl.[4] B43L *7/00*
U.S. Cl. 33—464 **3 Claims**

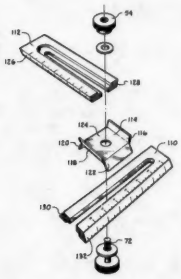
1. A stair template which comprises:

a plurality of horizontal members;

a plurality of vertical members; and

a connector, slidably engaged with a horizontal member and a vertical member and adjustable to hold said respective horizontal member in a right-angled relationship with said vertical member, said connector comprising a base plate, a pair of opposed sides upwardly extending from said base

plate to receive one of said horizontal members therebetween, and a pair of opposed sides downwardly extending



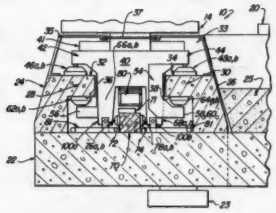
from said base plate to receive one of said vertical members therebetween.

4,882,847

COORDINATE MEASURING MACHINE WITH IMPROVED CARRIAGE WAY ARRANGEMENT

Thomas L. Hemmelgarn, Dayton, and Freddie L. Raleigh, Centerville, both of Ohio, assignors to The Warner and Swasey Company, Cleveland, Ohio

Filed Feb. 3, 1989, Ser. No. 305,598
Int. Cl.[4] G01B 7/03
U.S. Cl. 33—503 **19 Claims**



1. A coordinate measuring machine **(10)** having an improved carriage way arrangement, said coordinate measuring machine of the type including a base **(12)**, a probe shaft **(16)** having a tip **(18)**; mounting means **(14, 12)** mounting said probe **(16)** for movement along each of three orthogonal axes (X,Y,Z), said mounting means including a carriage **(40)** supporting said probe **(16)**, a way arrangement including way surfaces **(32,34)** extending along one of said axes, supporting way bearing means **(46*a,b*; 48*a,b*)** and guide bearing means **(72,74,76*a,b*; 78*a,b*)** supporting and guiding said carriage **(40)** for linear movement along said way surface **(32,34)** (X), characterized by the improvement wherein said way arrangement comprises:

a pair of spaced apart angled elongated way members **(24, 26)** affixed to a member **22**, of said base **(12)** parallel to each other and to said one axis, each of said way members **(24, 26)** having an inwardly extending overhang portion **(28, 30)** defining an upper horizontal way surface **(32, 34)** each extending along said one (X) axis;

said carriage **(40)** disposed between said way members **(24, 26)** and having first portions **(42, 44)** each extending outwardly to overlie an upper horizontal way surface **(32, 34)** on a respective way member **(24, 26)**;

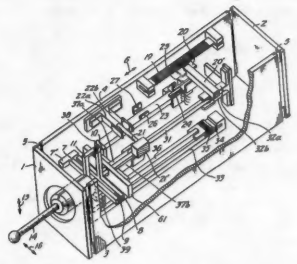
said support way bearing means **(46*a,b*; 48*a,b*)** interposed between each of said carriage first portions **(42, 44)** and a respective way surface **(32, 34)** enabling carriage movement therealong.

4,882,848

PROBE HEAD FOR A COORDINATE-MEASURING INSTRUMENT

Karl-Hermann Breyer, Heidenheim; Klaus Herzog, Oberkochen, and Franz Szenger, Königsbronn, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Oberkochen, Fed. Rep. of Germany

Filed Jul. 28, 1988, Ser. No. 225,162
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1987, 3725205; Jul. 30, 1987, 3725206
Int. Cl.[4] G01B 7/28
U.S. Cl. 33—559 **19 Claims**



1. A probe head for a coordinate-measuring instrument having a probe-suspension system which defines a three dimensional coordinate system wherein a probe can be deflected in all three directions in space, characterized by combination of the following features:

(a) a displacement-measuring system **(34, 34; 24, 25; 19, 20)** is provided in the probe head **(40)** for each of the three coordinate directions (x, y, z), each of said systems producing signals which are proportional to the deflection in the corresponding coordinate direction;

(b) each displacement-measuring system includes means for recognizing the zero position of the involved system;

(c) deflectable means **(22, 32, 37)** are provided to retain the probe **(14)** in the zero position of the displacement-measuring system, in the absence of a deflection force on the probe; and

(d) selectively operable means **(52)** are provided for switching the probe head **(40)** between the switching mode of operation in which a trigger signal is produced and is used for a coordinate measurement, and a measuring mode of operation in which signals generated by one or more of the displacement measuring systems are used for the coordinate measurement.

4,882,849

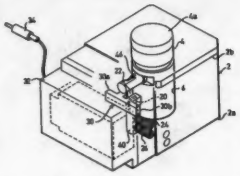
POSITION-ADJUSTING AND DISTANCE-MEASURING DEVICES PARTICULARLY USEFUL WITH MACHINE TOOLS

Shlomo Amir, 106 Machanayim Street, Tel-Aviv, Israel

Filed Jul. 25, 1988, Ser. No. 225,101
Claims priority, application Israel, Aug. 6, 1987, 83471; Apr. 20, 1988, 86130
Int. Cl.[4] G01B 3/20
U.S. Cl. 33—567 **13 Claims**

1. A position adjusting device for adjusting the position of an adjustable member with respect to a housing to which the adjustable member is mounted, characterized in that the adjustable member is formed with two conical sockets having axes parallel to each other and spaced from each other in the direction of adjustment of the adjustable member; and in that said

housing threadedly receives two pins eccentically disposed with respect to said sockets, such that threading one pin inwardly of its socket and the other pin outwardly of its socket



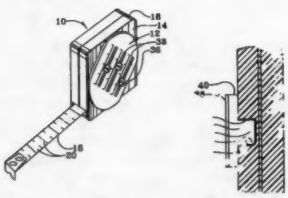
moves the adjustable member in one direction, and threading the one pin outwardly of its socket and the other pin inwardly of its socket moves the adjustable member in the opposite direction.

4,882,850

METHOD AND MEANS OF GENERATING DISTANCE MEASURING DATA AND RECORDING SAME

Warren M. Lindsey, 1120 Spring St., Apt. 603, Seattle, Wash. 98104

Filed Nov. 8, 1988, Ser. No. 268,706
Int. Cl.[4] G01B *3/10*
U.S. Cl. 33—760 **13 Claims**



1. The method of generating distance measuring data and recording same comprising the steps of:

providing a measuring tape having a housing on which a manually, operable slide indicator recorder is provided, said recorder including a slide indicator movable along a visable distance measuring unit scale registrable with said slide indicator to indicate a measured distance;

extending the measuring tape over the area to be measured;

reading the measuring tape for the measured distance data; and

recording the measured distance data from the tape by moving the slide indicator opposite the corresponding measuring unit on the measuring units scale.

4,882,851

APPARATUS AND METHOD FOR BATCH DRYING USING A MICROWAVE VACUUM SYSTEM

Scott Wennerstrum, Chicago, and Albert Kircher, Jr., Hinsdale, both of Ill., assignors to The Fitzpatrick Co., Elmhurst, Ill.

Filed Apr. 13, 1987, Ser. No. 37,610
Int. Cl.[4] B01K *5/00*
U.S. Cl. 34—60 **39 Claims**

1. A mechanism for batch drying of a powdered or particulate product, comprising, in combination:

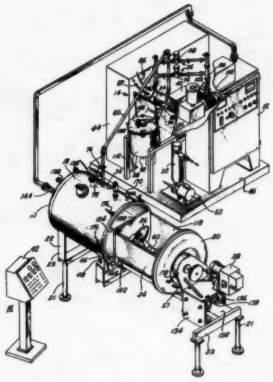
a chamber for drying the product;

a container for the product, rotatably mounted in the chamber to allow dumping thereof;

means for introducing microwaves into the chamber;

means for producing a vacuum in the chamber;

agitation means for agitating the product in the container



during drying, said agitation means including a plurality of paddles rotating about a shaft within the container; and

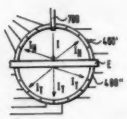
means for controlling the product's drying.

4,882,852

PROCEDURE AND MEANS FOR DRYING MOVING WEB MATERIAL

Jorma Kautto, Järvenpää , Finland, assignor to Imatran Voima Oy, Finland

PCT No. PCT/FI87/00140, § 371 Date May 25, 1988, § 102(e) Date May 25, 1988, PCT Pub. No. WO88/03193, PCT Pub. Date May 5, 1988
PCT Filed Oct. 26, 1987, Ser. No. 199,262
Claims priority, application Finland, Oct. 31, 1986, 864449
Int. Cl.[4] F26B *3/32*
U.S. Cl. 34—41 **18 Claims**



1. A procedure for drying a moving web material (E), wherein infrared radiation is directed on the material (E) to be dried, and the moving web material is transported through a radiation zone of an infrared radiator, the web material to be dried absorbing radiation, and wherein

on the moving web material to be dried, the radiation produced by at least one first infrared radiator (T_1) and the radiation produced by at least one second infrared radiator (T_2) are directed,

said radiators being disposed close to each other,

a maximum intensity wavelength ($\lambda_{maximum}$) (T_1) of the radiation from said first infrared radiator (T_1) being smaller than maximum intensity wavelenth ($\lambda_{maximum}$) (T_2) of the radiation from said second radiator (T_2),

whereby in the drying, a spectrum of total radiation is maximized in relation to absorption spectrum of the material to dried.

4,882,853

APPARATUS FOR CURING COATINGS APPLIED TO A MEMBER

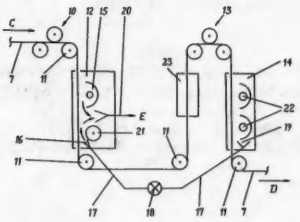
Volker Schaft, Barkenkoppel 38, 2000 Hamburg 65, Fed. Rep. of Germany

Filed Sep. 14, 1988, Ser. No. 244,127

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1987, 3730879; Jan. 12, 1988, 3800628

Int. Cl.[4] F26B *19/00*

U.S. Cl. 34—68 17 Claims



1. An apparatus for curing, by drying and/or hardening, layers or coatings, such as printing colors or inks, laminations, etc., that are continuously successively applied to a member, said apparatus comprising:

an IR drying mechanism that is disposed downstream of the last printing mechanism, of a printing press, for applying IR-reactive colors to said member;

a UV-radiation mechanism disposed downstream of a mechanism for applying a lacquer-like UV-reactive coating to said IR-treated printing colors on said member; and

means for introducing exhaust air from said UV-radiation mechanism into said IR drying mechanism.

4,882,854

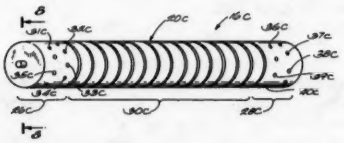
GUIDE ROLL APPARATUS FOR A DRYER OF A PAPER MACHINE DRYING SECTION

Gregory L. Wedel, Beloit, Wis., and J. Larry Chance, Rockton, Ill., assignors to Beloit Corporation, Beloit, Wis.

Filed May 26, 1987, Ser. No. 54,461

Int. Cl.[4] F26B *13/00, 13/30*

U.S. Cl. 34—115 13 Claims



1. A guide roll apparatus disposed adjacent to a dryer of a paper machine drying section, said apparatus guiding a contiguous web and web supporting felt through said drying section, said apparatus comprising:

a rotatable guide roll having an outer cylindrical surface defining a first and second edge portion and a central imperforate portion disposed between said edge portions;

said first edge portion defining a first plurality of air flow channels such that in use of the apparatus, when the web and felt are guided around said rotatable guide roll, air entrapped between said first edge portion and the felt wrapped around said first edge portion is permitted to flow through said first plurality of channels away from the felt so that fluttering of the web during guidance around said first edge portion is inhibited; and

said second edge portion defining a second plurality of air flow channels such that in use of the apparatus, when the web and felt are guided around said rotatable guide roll, air entrapped between said second edge portion and the felt wrapped around said second edge portion is permitted to flow through said second plurality of channels away from the felt so that fluttering of the web during guidance around said second edge portion is inhibited.

4,882,855

DRYER SECTION FOR DRYING A RUNNING WEB IN A PAPER OR BOARD MAKING MACHINE

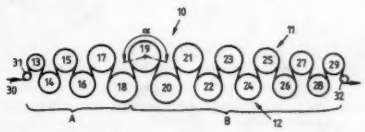
Hans Loser, Langenau; Tri Chau-Huu, and Albrecht Meinecke, both of Heidenheim, all of Fed. Rep. of Germany, assignors to J.M. Voith GmbH, Fed. Rep. of Germany

Filed Jun. 29, 1988, Ser. No. 213,094

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1987, 3721734

Int. Cl.[4] F26B *13/08*

U.S. Cl. 34—116 18 Claims



1. A dryer section of a paper or board making machine, the dryer section comprising:

a series of heated dryers, disposed such that a web to be dried having two sides can be wrapped at least partially around each of the dryers in series, such that the web is heated as it moves along the series of dryers;

said series of dryers comprising a first group of dryers having means to heat up the web after entering the dryer section to a level which is below a level of maximum evaporation rate;

a second group of dryers, following said first group of dryers, with each dryer of that second group having means to heat the web at least to the level of maximum evaporation rate;

said second group of dryers having a first dryer positioned substantially where the web enters the second group, and at least some of the dryers in series thereafter decreasing in diameter in the direction of web travel;

the number of dryers of said second group; being at least equal to the number of dryers of said first group and

at least said second group of dryers being arranged such that alternatingly both sides of the web contact said dryers.

4,882,856

CUSHION WEDGE FOR CUSTOM CONTROL OF IMPACT AND PRONATION UPON HEEL-STRIKE IN VARIOUS WEIGHTS OF WEARERS

John J. Glancy, 6280 Dean Rd., Indianapolis, Ind. 46220

Filed Apr. 25, 1988, Ser. No. 185,905

Int. Cl.[4] A43B *13/38*

U.S. Cl. 36—43 17 Claims

1. A shoe having an elevating heel portion, comprising:

an upper having a foot opening, an anterior portion, a posterior portion, a lateral side and a medial side, said upper being designed and arranged to receive a foot and being open downwardly in the posterior portion;

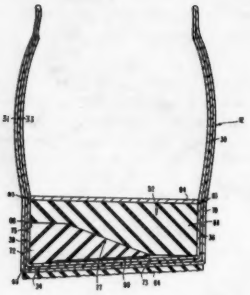
a midsole connected to the anterior portion of said upper;

a form including a combination board last and heel counter, said form having a medial wall; a lateral wall, a bottom panel and heel wall defining an upwardly opening cavity

coextensive with the elevating heel portion of the shoe, said form being connected to the posterior portion of said upper and to said midsole;

an outsole connected to said midsole and said form and extending along said upper from said anterior portion to said posterior portion thereof; and

an insert means for reducing impact forces and controlling medio-lateral rotation at heel-strike, said means including



an interchangeable insert sized and arranged to be inserted in said upwardly opening cavity coextensive with the elevating heel portion of the shoe through said foot opening and to be removable therethrough, said insert having a cushion portion incorporated therein which is more compressible than the remainder of said insert.

4,882,857

CLOSURE AND ADJUSTMENT DEVICE, PARTICULARLY FOR SKI BOOTS

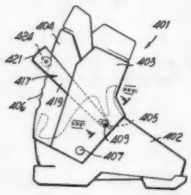
Mariano Sartor, Montebelluna, and Valerio Tonel, Barbissano, both of Italy, assignors to Nordica S.p.A., Montebelluna, Italy

Filed Jul. 29, 1987, Ser. No. 78,986

Claims priority, application Italy, Aug. 1, 1986, 82566 A/86; Oct. 29, 1986, 59462/86[U]; Oct. 29, 1986, 59464/86[U]

Int. Cl.[4] A43B *5/04*; A43C *11/00*

U.S. Cl. 36—120 **9 Claims**



1. In a ski boot of the rear entry type comprising a shell, a front quarter including an instep portion and a rear quarter having a rear surface, attachment means for pivotally connecting said front and rear quarters to said shell, an adjustable closure device for releasably closing said rear quarter against said front quarter to secure a skier's foot therebetween, the improvement consisting in that said adjustable closure device comprises a substantially rigid and U-shaped bracket including a pair of rod-like elements extending along each side of said front and rear quarters, a transverse cross member rigidly connecting said rod-like elements approximately to the rear ends thereof and arranged to face the rear surface of said rear quarter, hinge means for hingedly fastening the front ends of said rod-like elements with at least said front quarter at locations proximate to said instep portion thereof, said rear quarter having a toothed formation protruding rearwardly from said rear surface thereof and having teeth extending substantially horizontally, said cross member being further rigidly associated with a rotatable cam means selectively cooperable with the teeth of said toothed formation and adjustably movable thereagainst, whereby raising of said cross member causes rotation of said bracket in a substantially vertical plane so as to provide engagement of said rotatable cam means with said toothed formation to thereby exert a clamping action on both said front and said rear quarter, and whereby adjustment of said rotatable cam means provides variation in both said clamping action and independent inclination angles of said front and rear quarters with respect to said shell.

4,882,858

BOOTS FOR MOTORCYCLE CROSS-COUNTRY RACING

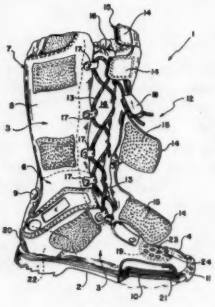
Dino Signori, Maser, Italy, assignor to SIDI SPORT S.a.s. di Dino Signori & C., Maser, Italy

Filed May 10, 1988, Ser. No. 192,765

Claims priority, application Italy, Feb. 29, 1988, 20747/88[U]

Int. Cl.[4] A43B *7/32, 5/14*

U.S. Cl. 36—131 **6 Claims**



1. A boot for motorcycle cross-country racing comprising:

a sole portion;

an upper affixed to said sole portion, said upper including a toe portion;

a bootleg affixed to said upper, said bootleg including malleolus portions and calf portions disposed on both sides of said bootleg;

said toe, malleolus and calf portions being of a predetermined thickness;

a plurality of holes formed in discrete areas of said toe, malleolus and calf portions of said boot;

a plurality of protection plates mounted within the predetermined thickness of said toe, malleolus and calf portions of said boot and being disposed in the discrete areas adjacent to said plurality of holes; and

a plurality of button-like, hollow portions constructed of an elastically deformable material projecting outwardly from said plurality of protection plates and through the plurality of holes in said discrete areas of said toe, malleolus and calf portions of said boot for attenuating shock transmitted to said boot.

4,882,859

EXCAVATING BUCKET HAVING SCOOPS

Karl Bollinger, Rueil Malmaison, France, assignor to Soletanche, Nanterre, France

Filed Oct. 25, 1988, Ser. No. 262,443

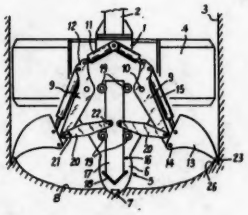
Claims priority, application France, Nov. 5, 1987, 87 15355

Int. Cl.[4] B66C *3/02*

U.S. Cl. 37—187 **6 Claims**

1. An excavating bucket apparatus including two scoops

mounted for movement with respect to a frame from an open terrain-engaging position to a closed position in which said scoops enclose cuttings, characterized by the fact that said apparatus includes a central bucket body means integral with said frame and having at least two lateral walls, support levers associated with each scoop, for mounting said scoops pivotally on said frame; closing means being provided to cause, when



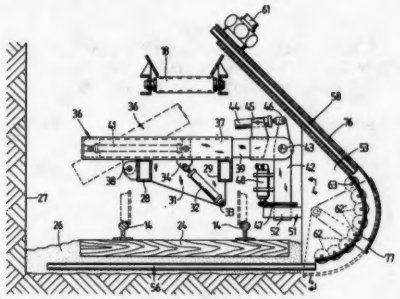
the bucket apparatus is in said closed position, a rotation of the scoops with respect to their support levers during a first phase, and to cause during a second phase, a rotation of the levers with respect to the frame, said scoops being arranged so that, in said closed position, they approach the central body from both directions with their lateral walls extending from the lateral walls of the central body.

4,882,860

APPARATUS FOR REMOVING BALLAST FROM BENEATH RAILROAD TRACKS

John B. Whitaker, Jr., Wetumpka, Ala., assignor to Kershaw Manufacturing Company, Inc., Montgomery, Ala.

Filed Sep. 12, 1988, Ser. No. 242,555
Int. Cl.[4] E01B *27/04*
U.S. Cl. 37—191 A **12 Claims**



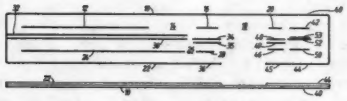
6. Apparatus supported on a track mounted carriage for removing ballast from beneath a railroad track comprising a continuous chain undercutter including a chain mounted for circuitous movement along the periphery of said undercutter such that said chain is constrained to move along a first peripheral portion extending beneath said railroad track from a first side thereof to an opposite side thereof, thence along a second peripheral portion beneath said railroad track from said opposite side to said first side, thence along a curvilinear third peripheral portion upwardly about the first side of said track, thence along a fourth peripheral portion inclined at an acute angle relative to said second peripheral portion and extending above said track mounted carriage; thence along a fifth peripheral portion parallel to and co-planar with said fourth peripheral portion, thence along a curvilinear sixth peripheral portion parallel to said curvilinear third peripheral portion to said first peripheral portion, whereby ballast is removed from beneath said track by said chain as it moves along said peripheral portions; and conveying means mounted atop said carriage for receiving and conveying ballast from said continuous chain undercutter proximal said fourth peripheral portion.

4,882,861

BAGGAGE AND SECURITY LABEL, PRIMARILY FOR USE BY AIRLINES

Peter G. Holmes, Tattershall Thorpe; Michael Lowe, Great Hale, and Christopher Donaghue, Boston, all of England, assignors to Norprint International Limited, Boston, England

Filed Oct. 15, 1987, Ser. No. 109,213
Claims priority, application United Kingdom, Oct. 15, 1986, 24714
Int. Cl.[4] G09F *3/100*
U.S. Cl. 40—299 **8 Claims**



1. A labelling tag comprising four members initially detachably adhered together to form a whole assembly such that each member is adhered to at least one other such member, a first said member being elongate and having

a first pressure-sensitive adhesive layer covering a portion only of one face of the member such that when separated from the other members the first member can form a loop by a non-adhesive coated portion thereof becoming adhered to the first adhesive layer.

a second said member partially covering and being detachably adhesively secured to the first said member by said first adhesive layer,

a third said member separate from the first member but initially lying in the same plane as and forming effectively a continuation of the first member, and

a fourth said member completely covering and being detachably adhesively secured to the third member and partly covering and being detachably adhesively secured to an end portion of the first member so that the fourth member effectively spans the first and third member and thus maintains the tag integral until the point of use.

4,882,862

CLIP FOR MOUNTING PRICE CARDS UPON CONTAINER EDGES

Robert J. Slavsky, Sr., Lathrup Village, Mich., assignor to Shaw & Slavsky, Inc., Detroit, Mich.

Filed Jan. 14, 1988, Ser. No. 143,723
Int. Cl.[4] G09F *3/00*
U.S. Cl. 40—324 **14 Claims**

1. A clip for mounting a small size, price display type card

upon different shaped edges of the walls of open top containers such as bowls and the like, comprising:

a generally horizontally, rectangularly shaped base having a pair of integral, resilient legs extending downwardly from opposite edges to form a downwardly opening, edge receiving channel for fitting over the upper edge of a wall of an open top container;

two pairs of upwardly extending, generally parallel legs, integrally formed on the upper surface of the base, with the legs spaced closely to each other to form an upwardly opening card receiving channel between the legs of each pair of legs, and a third, central upwardly opening channel formed by the space between the two pairs of legs;

the adjacent surfaces of the two adjacent legs of each pair being sloped at an angle relative to the vertical to form angled, outermost card receiving channels that receive and hold the lower edges of cards with the cards tilted at an angle relative to the base, that is, tilted relative to vertical;

the central channel formed by the space between the two pairs of legs being about perpendicular to the base for holding the edge of a card about vertically;

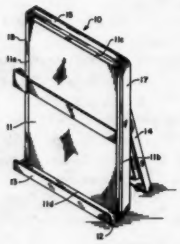
whereby a card edge may be selectively inserted within one of the three card receiving channels for holding the card in a tilted or vertically directed position.

4,882,863

NONMAGNETIC COPYHOLDER AND CLIP

Richard L. Gross, Fox River Grove, Ill., assignor to Wilson Jones Company, Chicago, Ill.

Filed Sep. 24, 1987, Ser. No. 100,512
Int. Cl.[4] B41J *11/64*
U.S. Cl. 40—352 **7 Claims**



4. A copyholder comprising

(a) plastic planar frame means capable of supporting a stack of sheets of paper with said frame means including a side piece;

(b) plastic block means including rail means movable along the side piece and in engagement with the side piece due to the compressibility and deflectability of the side piece or the block means and such side piece and block means being maintainable in selected relative plastic-to-plastic positions relative to one another by torque and friction;

(c) extension means having a lower end and an upper end frictionally engageable in the block means and extending therefrom for movement substantially perpendicular to the plane of the frame means;

(d) pivotal plate means pivotally mounted on the upper end of the extension means; and

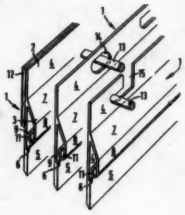
(e) arm means secured to the plate means whereby the arm means (1) may be moved along the side piece and held, through compression of the side piece or block means, in a selected position and (2) may be moved toward or away from the planar frame as the extension means moves in the block means.

4,882,864

DOCUMENT SUSPENSION APPARATUS

Clive Selwyn-Smith, Weston on the Green, United Kingdom, assignor to Locwyn Limited, Oxon, England

Filed Nov. 12, 1987, Ser. No. 119,682
Claims priority, application United Kingdom, Nov. 19, 1986, 8627643; Jun. 25, 1987, 8714914
Int. Cl.[4] B65D *27/00*
U.S. Cl. 40—359 **15 Claims**



1. Suspension apparatus comprising a track having first and second walls dependent from a bridging portion and defining a channel, support means for the track, a step facing the bridging portion formed within the channel and on the first wall and, a suspendable article having a lamina edge portion defining an abutment; wherein said track further comprises a resiliently flexible guide member extending from the second wall, which guide member is arranged to guide the lamina edge portion into the channel from a direction transverse to the channel and, to co-operate with said step to positively engage said suspendable member, when said lamina edge portion thereof is within the channel and said abutment is in contact with said step, thereby supporting the suspendable article and preventing the release of the suspendable article in said transverse direction.

4,882,865

LIGHT-ANIMATED GRAPHICS DISPLAY

Frits J. Andeweg, 7737 Royal La., Dallas, Tex. 75230

Filed Jan. 21, 1988, Ser. No. 146,390
Int. Cl.[4] G09F *13/00*
U.S. Cl. 40—442 **2 Claims**

1. In combination, a shirt and a light-animated graphics display system associated with said shirt, said graphics display system comprising:

(a) a graphic illustration disposed upon an outer face of said shirt;

(b) discrete light sources comprising light-emitting diodes disposed along, and forming an integral part of, said graphic illustration, said diodes extending through open-

ings in said shirt at selected locations along said illustration;

(c) pre-programmed timing circuit control means disposed at the interior surface of said shirt for sequentially illuminating said diodes in a manner which creates the illusion of movement from one location on said illustration toward a second spaced location on said illustration; and

(d) portable battery means for powering said timing circuit control means, said battery means being retained in a pocket fixed to said interior surface of said shirt.

4,882,866

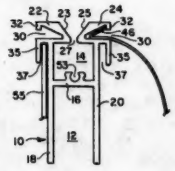
SIGNAGE SYSTEM SUPPORT STRUCTURE

Roland Gebhardt, 67 Vestry St., New York, N.Y. 10013

Filed Dec. 15, 1986, Ser. No. 941,595

Int. Cl.[4] G09F 7/02

U.S. Cl. 40—611 **17 Claims**



1. A signage system suport structure comprising a pair of multigrooved channel members, each channel member having a pair of spaced parallel legs joined by a web to form oppositely facing medial grooves, which in conventional usage of the support structure will face upwardly and downwardly; an inwardly extending flange secured at one end of each of said legs to constrict one of said medial grooves; a lateral groove on at least one side of said medial grooves on each channel member, said lateral groove formed on the same side of each channel member when joined into said support structure; an outwardly facing groove in each flange; and a connecting element positioned to extend between said channel members and arranged within a medial groove of each connected channel member.

4,882,867

DENTAL INSTRUMENT HAVING IDENTIFICATION MARKINGS

Sigurd R. Lindén, Teatergatan 4, S-582 22 Linköping, Sweden

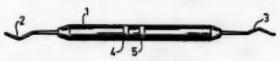
PCT No. PCT/SE87/00114, § 371 Date Aug. 3, 1988, § 102(e) Date Aug. 3, 1988, PCT Pub. No. WO87/05487, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 6, 1987, Ser. No. 228,914

Claims priority, application Sweden, Mar. 13, 1986, 8601188

Int. Cl.[4] G09F 3/02

U.S. Cl. 40—625 **4 Claims**



1. A dental instrument of the type comprising an elongate handle portion (1) which consists of a plastic material and which, at least at its one end, has an instrument (2, 3), the circumferential surface of the handle portion exhibiting annular zones (4, 5) which are of mutually different colours for the purpose of facilitating identification of an instrument to be selected by the dentist, namely in the way that instruments having different functions comprise annular zones in different numbers and/or in different colours, characterized in that each annular zone (4, 5) is constituted by the circumferential surface of a member (7) having a shape selected from the group comprising a ring, a sleeve and a disc, and is supported by a shaft-like extension (6) of the instrument portion extending inside the handle portion between the two ends thereof.

4,882,868

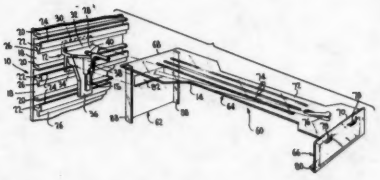
PRODUCT INFORMATION TAG WITH SPECIALIZED MOUNTING PORTION

Jacob Fast, 7561 NW. 9th St., Plantation, Fla. 33317

Filed Mar. 21, 1989, Ser. No. 326,792

Int. Cl.[4] A47G 29/10

U.S. Cl. 40—657 **6 Claims**



1. A product information and display tag for use with a substantially horizontal oriented product suspension hook, the hook having a proximal end bracket for releasably attaching same to a wall panel and the like, said bracket including a horizontal flange having a back edge and a front edge, a depending flange extending from the horizontal flange, a depending handle extending from the horizontal flange forwardly of the depending flange with a neck formed between the handle and the depending flange, and attachment means on the bracket for an elongate product support hook, the tag comprising an elongate flexible sheet having a proximal end mounting portion for attachment to the bracket, an elongate intermediate body portion for extending over the hook, and a distal end display portion for product information, the mounting portion having an opening for receiving the bracket by inserting the handle through the opening and twisting the bracket so that one edge of said opening is located between said depending flange and said handle adjacent the neck and an opposite edge of the opening is located above said horizontal flange, wherein the width of the opening between said edges is less than the distance between said neck and the front edge of said horizontal flange to preclude the mounting portion from working forwardly over the front edge of said horizontal portion when the tag is in use.

4,882,869

COMBINATION RIFLE REST AND ANIMAL CHOKE STICK

John R. Webster, 12219 Navajo St., Savannah, Ga. 31419

Filed Aug. 11, 1988, Ser. No. 231,029

Int. Cl.[4] F41C 29/00

U.S. Cl. 42—94 **6 Claims**

1. A portable device for permitting the resting of a rifle or other firearm at any position including prone, kneeling, sitting and standing, comprising:

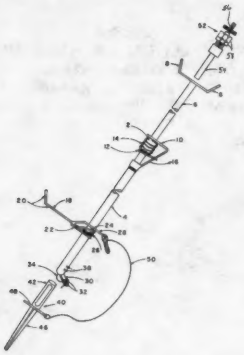
inner and outer hollow cylindrical rigid tube members, each said tube member having a proximal end and a distal end, said inner tube member being telescopically received through the proximal end of said outer tube member, said tube members thereby providing support for a rifle or other firearm in a stable, balanced attitude;

an upper firearm supporting yoke provided at the proximal end of the inner tube member;

a lower firearm support coupled to the outer tube member: means for mounting a ground spike for insertion into the ground to the distal end of said outer tube member; and

means for adjusting a length of the inner tube member ex-

tending proximally from the outer tube member and for locking said inner tube member relative to said outer tube member so that the upper firearm support means can be continuously adjusted in height and locked into place,



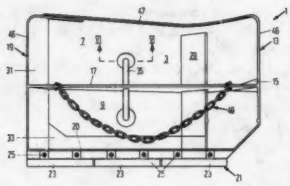
wherein said outer tube member further includes means for continuously adjusting the position of the lower firearm support along the outer tube member and for locking the lower firearm support in place.

4,882,870

TRAWLER DOOR

Peter S. Andreasen, Sprogovej 10 A, DK-7680 Thyboron, Denmark

Filed Nov. 3, 1988, Ser. No. 266,816
Int. Cl.[4] A01K *73/04*
U.S. Cl. 43—9.1 **4 Claims**



1. A trawler door with relative dimensions in its functional position such that the height of the door is at most seventy five per cent of its length, comprising two longitudinally arcuate platelike body parts joined along a longitudinal edge with an obtuse angle between said body parts, the joint between said body parts being stiffened by a platelike reinforcing member extending substantially along the whole length of said joint, at least one of the said body parts being stiffened by at least one tubelike member of circular or elliptical cross section affixed at one end to the said reinforcing member and at the other end to a location on one said body parts.

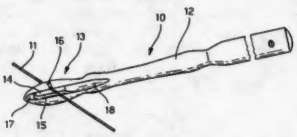
4,882,871

HOOK-DISGORGING DEVICE

Paolicchi Marina, Lucca, Italy, assignor to Nedo Berutto, San Marco, Italy

Filed Feb. 21, 1989, Ser. No. 312,974
Claims priority, application Italy, Feb. 22, 1988, 17704 A/88
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—53.5 **8 Claims**

1. A disgorging device for removing hooks from the mouth and gullet of a fish comprising a stem portion having a longitudinal axis and a hook-disgorging head portion at at least one of said stem portion, to be guided along a fishing line connected to a hook to be removed, said head portion comprising an annular elongated aperture, having a transverse slit on a side



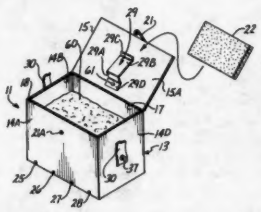
for inserting the fishing line, said aperture being delimited internally by opposite guiding surfaces extending into a rear guiding groove on each side and along a longitudinal portion of the stem.

4,882,872

LIVE BAIT STORAGE CONTAINER AND METHOD OF USING SAME

Harry V. Todd, 2429 Windmill View, El Cajon, Calif. 92020

Filed Aug. 11, 1988, Ser. No. 231,195
Int. Cl.[4] A01K *97/04*
U.S. Cl. 43—55 **8 Claims**



6. An apparatus for storage of live bait, comprising:
container means for storing live bait storage media;
means defining an access opening therein in the top portion thereof;
closure means movably mounted on said container means for moving between an opened position and a closed position over said opening;
means defining aeration apertures in the bottom portion of said container means;
carrying means pivotally attached to said container means for enabling it to be transported in an inverted position;
moisture reservoir means disposed near said access opening to attract live bait stored in said container means when stored in said inverted position; and
resilient clip means for retaining releasably said moisture reservoir means to said closure means.

4,882,873

INSECT ELIMINATION KIT AND METHODS FOR ITS USE

Gabriel L. Purnell, Rte. 2, Box 100C, Berlin, Md. 21811

Filed Apr. 2, 1987, Ser. No. 33,271
Int. Cl.[4] A01M *7/00*
U.S. Cl. 43—132.1 **9 Claims**

1. A method for eliminating fleas and other crawling insects from a confined area comprising:
(a) thoroughly cleaning said area;
(b) spraying said area with an effective insecticidal amount of a residual insecticide:

(c) fogging said area with a flush and kill agent containing at least 1.07% pyrethrins or a synthetic pyrethroid;

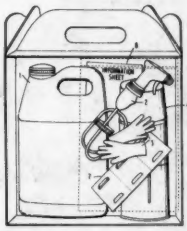
(d) after vacating said area to allow said residual insecticide to dry and said flush and kill agent to dissipate, strategically placing at least one white monitoring flea or insect trapping device having glue on at least one surface thereof in said area to detect the presence of any live fleas or other insects; and

(e) after a prior of about 3–14 days, selectively reapplying said flush and kill agent as necessary to portions of said area where said monitoring device or visual sightings have detected flea or insect life.

5. A kit for eliminating fleas and other crawling insects from a confined area for use in the method of claim 1 comprising:

(a) a container filled with a residual insecticide;

(b) an adjustable spray dispenser for said container;



(c) an aeorsol container filled with a flush and kill agent containing at least 1.07% pyrethrins or a synthetic pyrethroid;

(d) a standard fogging nozzle for dispensing said flush and kill agent from said aerosol container;

(e) a fogging nozzle having a long, thin, tubular extension for spraying said flush and kill agent in cracks, crevices and voids in said area where fleas and insects may live or hide;

(f) at least one white monitoring insect trapping device having glue on at least one surface thereof; and

(g) an information sheet explaining how to use the contents of said kit to achieve total flea and insect elimination from said area,

wherein the kit components are packaged within a secure, portable container.

4,882,874

PESTICIDE APPLICATOR

Peter O. Paulson, 320 Pumphill Gardens S.W., Calgary, Alberta, T2V 4M7, and James E. Paulson, 2021 Seventh Street S.W., Calgary, Alberta, T2T 2X1, both of Canada

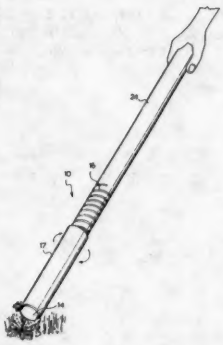
Filed Jul. 28, 1988, Ser. No. 225,499

Claims priority, application United Kingdom, Aug. 21, 1987, 8719814

Int. Cl.[4] A01N *5/00*

U.S. Cl. 47—1.5 **15 Claims**

1. A pesticide applicator comprising an elongated tube, a telescopic sleeve mounted on said tube on one end thereof and projecting from said tube for axial movement for extension and retraction thereon, a pesticide-solid carrier composition disposed within the sleeve and extending into an adjacent end of the tube, and means for anchoring said pesticide-solid carrier composition within the said adjacent end of the tube, whereby



retraction of the telescopic sleeve on the tube exposes the pesticide-solid carrier composition.

4,882,875

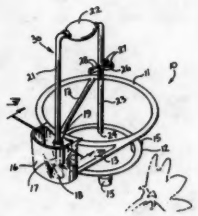
PLANT HOLDER APPARATUS

Kenneth P. Green, 2712 Pennsylvania, Wichita Falls, Tex. 76309

Filed Dec. 23, 1988, Ser. No. 289,263

Int. Cl.[4] A01G *27/00*

U.S. Cl. 47—79 **4 Claims**



1. A plant holder apparatus comprising, in combination,

a pot, and a ring means for securement of said pot therewithin, and

a reservoir secured to said ring means including a siphon tube apparatus;

said siphon tube apparatus including a first conduit directed into said reservoir in fluid communication with a second directed into said pot, and

pump means for directing fluid from said first conduit into said second conduit, and

wherein said ring means includes an upper support ring of a first diameter axially aligned with and overlying a lower support ring of a second diameter less than said first diameter, and said pot is tapered downwardly for securement within said upper and lower rings, and

including a plurality of resilient friction pads integrally secured to and downwardly directed from said lower support ring, and

wherein said reservoir is transparent for visual observation of a fluid level within said reservoir, and

wherein said first conduit includes a pick-up tube with a screened first end, and said pick-up tube includes a dovetail slidably received within a dove-tail slot formed within a wall of said reservoir for selective removal of said siphon tube apparatus with respect to said reservoir.

4,882,876

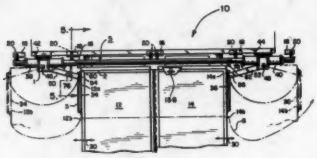
DOOR OPERATOR WITH LOCKING MECHANISM

Kristupas Daugirdas, Wilmette, Ill., assignor to Vapor Corporation, Chicago, Ill.

Continuation of Ser. No. 209,464, Jun. 21, 1988. This application Mar. 23, 1989, Ser. No. 328,097

Int. Cl.[4] E05B *65/10*

U.S. Cl. 49—141 5 Claims



1. In a power operator for a vehicular door said door mounted by frame means so as to be driven by said operator along a track between open and closed positions, the improvement comprising:

a generally rectangular door having structural members, and structurally integrated surfaces;

an edge defined by said door surfaces;

means mounting a locking pawl to said frame for selectively abutting and clearing said edge;

means in said mounting means for moving said pawl between a door unlocked position clearing said edge and a door locked position abutting said edge, so as to prevent opening of said door when said pawl and edge are in abutment; and,

means sequentially actuating said operator and pawl moving means so as to positively lock said panel in a closed position.

4,882,877

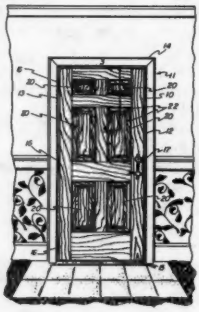
RESIDENTIAL DOOR MANUFACTURE AND INSTALLATION

Norbert J. Guetle, Jr., Cincinnati, and Daniel J. Spencer, Hamilton, both of Ohio, assignors to Pease Industries, Inc., Fairfield, Ohio

Filed Jan. 23, 1989, Ser. No. 300,442

Int. Cl.[4] E06B *3/00*

U.S. Cl. 49—506 18 Claims



1. The method of providing a completely finished residential door of wood at the site of the residence where it is to be installed in a door frame of predetermined dimensions and of protecting said door prior to installation thereof, comprising the steps of:

(a) constructing a wood door blank of predetermined dimensions to fit said door frame,

(b) providing in said door blank the cut-outs needed for the installation of hardware,

(c) finishing said door blank including the interiors of all such cut-outs,

(d) enclosing the resulting finished door in a protective package, and

(e) shipping said package to and storing said door in said package at said site while said residence is being completed.

4,882,878

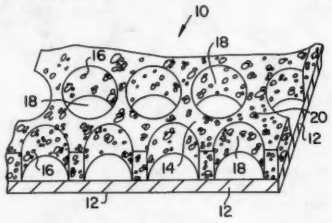
GRINDING WHEEL

Robert L. Benner, 4 Valley Dr., Chalfont, Pa. 18914

Filed Aug. 5, 1988, Ser. No. 228,890

Int. Cl.[4] B24D *5/00*

U.S. Cl. 51—206 R 1 Claim



1. In a grinding wheel having

(a) a rigid matrix containing a given predetermined amount of particulate diamond or cubic boron nitride abrasive uniformly dispersed therein; and

(b) a wheel grinding surface exposing said abrasive continually as the matrix wears away in grinding;

an improvement which comprises:

said grinding wheel a plurality of spaced apertures extending into the wheel from said wheel grinding surface

wherein

(1) each of said apertures has a generally circular area at the wheel grinding surface of about 0.07 to about 0.08 inches in diameter spaced apart about 0.110 inches from center to center and

(2) the plurality of spaced apertures has a total area at the wheel grinding surface and a total volume in the wheel in the range of from about 40% to about 60% of that of a solid grinding wheel without apertures;

whereby

said abrasive is concentrated in the reduced volume of the matrix, and reduced area of the matrix at the wheel grinding surface, of said wheel with said apertures, thus increasing the effective concentration of said abrasive in said matrix at the grinding surface of said wheel with said apertures in the range of about 40% to about 60%, compared to a solid, rigid grinding wheel having a continuous grinding surface without apertures and having the same said given predetermined amount of particulate diamond or cubic boron abrasive uniformly dispersed therein.

4,882,879

FLEXIBLE ABRASIVE GRINDING TOOL

R. Brown Warner, Westlake, and Alfred F. Scheider, Orange, both of Ohio, assignors to Jason, Inc., Cleveland, Ohio

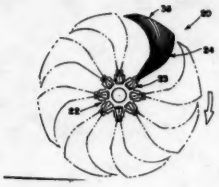
Filed Jul. 8, 1988, Ser. No. 216,709

Int. Cl.[4] B24B *9/02*

U.S. Cl. 51—337 23 Claims

1. A flexible abrasive grinding tool comprising a hub, discrete bristle tufts of stiff yet flexible abrasive loaded plastic

filaments secured to said hub and projecting radially outwardly and then curving circumferentially; said filaments



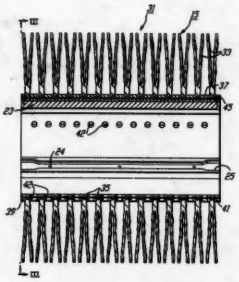
being elastically shaped to form a predetermined curve which retains a curved shape.

4,882,880

GANGING OF BUFFING WHEELS

Paul E. Schaffner, II, Pittsburgh, and Gus J. Schaffner, III, Emsworth, both of Pa., assignors to Schaffner Manufacturing Company, Inc., Emsworth, Pa.

Filed May 17, 1988, Ser. No. 194,973
Int. Cl.[4] B24D *13/04*
U.S. Cl. 51—358 17 Claims



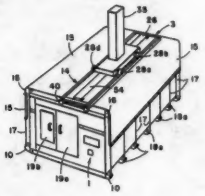
1. A ganged buffing wheel assembly including a shaft, a plurality of driving components mounted spaced circumferentially on said shaft, and being continuous and extending substantially along the entire active length of said shaft, each of said driving components consisting of one of the set of components consisting of a key and a keyway, a plurality of elongated sleeves mounted abutted coaxially and coextensively on said shaft without interconnecting couplings between said abutted sleeves, each said sleeve having mounted on the inner surface thereof a plurality of driven components, each of said driven components consisting of the other of said set of components, said sleeves being oriented on said shaft so that said driven components are coextensive and are in engagement with said drive components on said shaft so that said abutted sleeves may be driven together, and a plurality of buff sections mounted on, and connected to, each said sleeve to be driven when each said sleeve is driven by said shaft, said driven components being continuous and mounted along substantially the entire axial length of said each said sleeve so that the stress exerted by said driven components on said sleeve is minimized, said sleeve and said driven components being composed of light-weight material having low resistance to stress and substantially lower thermal conductivity than metal such as steel.

4,882,881

ROBOT POSITIONER AND SEAL ARRANGEMENT FOR A CLOSED CHAMBER

Lewis L. VanKuiken, Jr., Grand Rapids, and Dale A. Hanson, Hudsonville, both of Mich., assignors to Progressive Blasting Systems, Inc., Grand Rapids, Mich.

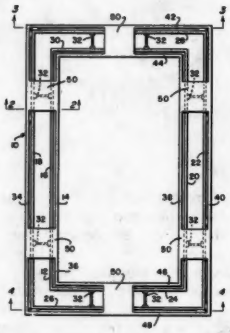
Continuation of Ser. No. 17,537, Feb. 24, 1987, abandoned. This application Jun. 28, 1988, Ser. No. 212,658
Int. Cl.[4] B24C *9/00*
U.S. Cl. 51—426 24 Claims



1. Apparatus for treating an object within an entirely enclosed compartment having enclosed sides and an enclosed ceiling covering the top of said compartment including an operative device manipulated by a robot manipulator means having an elongated mast extending downwardly through the ceiling of said compartment and supporting said device at its lower end for movement within said compartment and supporting said device at its lower end for movement within said compartment; said device being adapted to treat said object with a substance some of which is capable while said treatment is taking place of escaping through any opening in said compartment; the improvement comprising means for enclosing said ceiling in which said manipulator means adjusts the mast during such treatment and while it is extending through said ceiling such adjustment being in a direction along at least two horizontal orthogonal "X" and "Y" coordinates; said manipulator means comprising a carriage assembly extending in a direction along the "Y" coordinate and mounted over said top for movement in a direction along the "X" coordinate, said carriage assembly having an elongated opening extending in the direction of said "Y" coordinate and through which said mast extends; a cart assembly mounted on said carriage assembly and supporting said mast for moving said mast through and along the said opening; first motive means for causing said carriage to move in a direction along the "X" coordinate; second motive means for causing said cart assembly to move along said carriage assembly in a direction along said "Y" coordinate; a first belt cover means having first and second portions each attached respectively to and extending from each of the sides of such carriage and except for the portions occupied by said carriage assembly extending in a direction along the "X" coordinate over the open portions of the top of said compartment whereby said first belt cover means moves with said carriage in a direction along the "X" coordinate; means attached to each of the ends of said first and second portions and operatively connected together to take up the slack in one of said first and second portions while keeping said other portion taut as it moves with the carriage so as to continuously provide a ceiling for the compartment; a second belt cover means having first and second portions attached respectively to the ends of said cart assembly and extending in a direction along the said "Y" coordinate from such ends for covering the open portions of said elongated opening whereby said second cover means moves with said cart assembly in a direction along the "Y" coordinate; means attached to the ends of said first and second portions of said second belt cover means and operatively connected together to take up the slack in one of said first and second portions while keeping said other portion taut as it moves with said carriage so as to continuously cover said elongated opening whereby the open top of said

compartment is completely covered by said carriage assembly, said cart assembly and said first and second cover means regardless of the position of the elongated mast as it is moved by said carriage and cart assemblies along the "X" and "Y" coordinates.

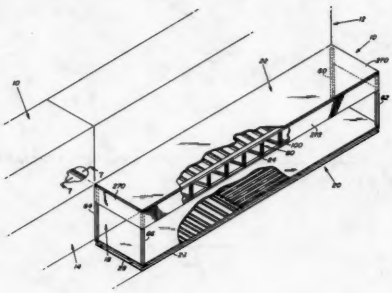
4,882,882
FORM FOR A MORTAR CAP
Ronald Werner, 12-204 Dell Pl., Stanhope, N.J. 07874
Filed Apr. 4, 1988, Ser. No. 177,086
Int. Cl.[4] E02D *29/14*
U.S. Cl. 52—21 **10 Claims**



1. A form for a mortar cap, for receiving cementitious materials therewithin, such as cement, mortar, and the like, to define a footing for a catch basis grating, comprising:
a base frame having parallel, spaced-apart walls; and
an ancillary frame also having parallel, spaced-apart walls; wherein
said base frame is set within said ancillary frame;
said ancillary frame is slidably and vertically displaceable relative to said base frame;
said base frame has a plurality of ligaments joining said walls thereof, and fixing said walls thereof in said spaced-apart disposition; and
said ligaments have openings formed therein to accommodate a flow therethrough of cementitious materials.

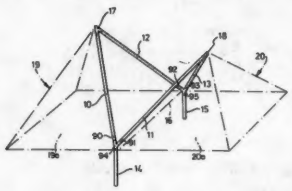
4,882,883
ARCHITECTURAL MODULAR SYSTEM
John J. Horn, El Toro, Calif., assignor to PBS Building Systems, Inc., Anaheim, Calif.
Filed Feb. 25, 1987, Ser. No. 18,916
Int. Cl.[4] E04B *1/34*
U.S. Cl. 52—79.1 **5 Claims**

1. A building formed of a plurality of modular structures wherein each of said modular structures comprises:
a base floor region
a perimeter channel member in said base floor region of said structure;
joists between said perimeter channel member;
a metal corrugated decking secured to said joists;
upright columns extending from said perimeter channel member;
truss members having cords extending between said upright column members and wherein the cords of said truss members are secured to said column members;
said cords of said truss members having an upper and lower cord portion;
bracing members in the form of rafters extending between said trusses;
plywood sheeting overlying said corrugated decking;
diagonally oriented angle members extending between said cords of said trusses and secured thereto;
a plurality of modular structures joined together by securement means extending between said perimeter channel members; and,



plates between said columns in the form of column tie plates for securing one column of a modular structure to a second column of an adjacent modular structure.

4,882,884
BUILDING STRUCTURES
Antony N. Browne, Eastcombe, United Kingdom, assignor to Nomad Structures International, Ltd., Stroud, United Kingdom
Continuation of Ser. No. 26,762, Mar. 2, 1987, abandoned. This application Jan. 3, 1989, Ser. No. 292,909
Claims priority, application United Kingdom, Jul. 8, 1985, 8517237
Int. Cl.[4] E04B *7/14*
U.S. Cl. 52—82 **9 Claims**



1. A portable building structure for use in tents, awnings, canopies and the like, the building structure comprising an assembly of collapsible framework modules, each module comprising a plurality of elongate frame members and means for assembling the frame members to form two inverted V-frames, a pair of legs for supporting said inverted V-frames thereon, the inverted V-frames lying in planes oppositely inclined to the vertical, each frame member having angularly spaced longitudinal grooves, and a connecting strip for interconnecting adjacent modules and having beaded edges and a flexible covering also having beaded edges, said longitudinal grooves slidably receiving respective beaded edges of said flexible covering and respective beaded edges of said connecting strip, said means for assembling the frame members including a first pair of joints each providing an apex junction for joining the frame members at apices of respective inverted V-frames, and a second pair of joints each forming a Y-junction for joining ends of the two inverted V-frames facing away from said apices to one another and to a respective leg, each of said joints comprising at least two hinge members pivotable

between open and closed positions such that the building structure is erectable from a collapsed configuration in which the frame members lie substantially parallel with one another.

4,882,885

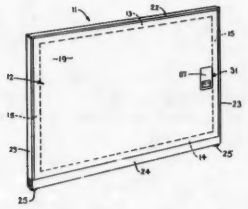
PANEL PORT RETENTION SYSTEM

Louis M. Chatterson, Kentwood, and Bruce Cutean, Holland, both of Mich., assignors to Haworth, Inc., Holland, Mich.

Filed Jan. 6, 1989, Ser. No. 295,082

Int. Cl.[4] E04B 5/48

U.S. Cl. 52—221 **6 Claims**



1. In an upright space-dividing wall panel having a generally rectangular ring-shaped interior framework, a pair of thin sheet-like side skins secured to opposite sides of said ring-shaped framework and extending across the interior thereof, a layer of a flexible sound-absorbing material coextensively overlying the exterior surface of a first said side skin, and a thin layer of flexible fabric directly and exteriorly overlying said layer of sound-absorbing material for defining an exterior side surface of the panel, the improvement comprising:

said first skin having a generally rectangular opening formed therethrough for communication with a core region defined between said skins within said ring-shaped framework, said rectangular opening being spaced at least a small horizontal distance inwardly from one vertical edge of the panel, and being spaced downwardly a substantial distance from the upper edge of the panel and upwardly a substantial distance from the lower edge of the panel, whereby said rectangular opening is disposed approximately at worksurface height;

said sound absorbing layer and said fabric layer also having generally rectangular openings therethrough substantially in alignment with and approximately corresponding to the opening through said first skin, the opening through said fabric layer being spaced inwardly from the vertical free edge of the fabric layer;

an inner frame positioned between said skins in at least partial surrounding relationship to the opening formed in said first skin, said inner frame being removably positioned between said skins;

an electrical power unit stationarily mounted on said inner frame and positioned substantially within the core region in alignment with the opening in said first skin, said electrical power unit having means which project outwardly of said opening and define a conventional electrical socket which is disposed approximately flush with the side surface of the panel;

an outer ring-shaped frame of generally rectangular configuration positioned so as to directly overlie the outer surface of said first skin in surrounding relationship to the opening therethrough, said outer frame and said inner frame being fixedly fastened together so that said first skin, in the vicinity of the opening therethrough, is fixedly sandwiched therebetween;

said ring-shaped outer frame having an inner generally rectangular-shaped edge defining a frame opening which is aligned with and approximately corresponds in size to the opening through said first skin, said fabric layer having edge parts in the vicinity of the rectangular opening therethrough which are wrapped around the inner edge of said outer frame;

elongated resilient channel-shaped fabric retainers positioned over the inner edge of said outer frame for clamping the edge parts of the fabric layer therearound; and

a cover assembly removably attached to said panel for closing off said openings, said cover assembly including a generally one-piece cover of generally planar configuration disposed approximately coplanar with the side surface of the panel, said cover assembly having inwardly projecting clips which create a snap-type releasable engagement with the outer frame, said cover having an opening therethrough for accommodating the electrical socket.

4,882,886

AUTOMATICALLY-RELEASABLE PIPE ATTACHMENT DEVICE

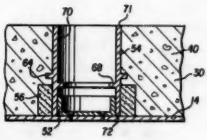
Gerold J. Harbeke, 2807 South Military Trail, West Palm Beach, Fla. 33415

Filed Sep. 1, 1987, Ser. No. 92,337

The portion of the term of this patent subsequent to Feb. 17, 2004, has been disclaimed.

Int. Cl.[4] E04F 17/00; F16L 3/00

U.S. Cl. 52—232 **2 Claims**



1. Pipe attachment apparatus for producing a fire-spread prevention pipe coupler in a concrete form wall, said apparatus including:

an elongated, cylindrical, female-at-both-ends, pipe coupler having a pipe-coupler wall with external and internal radially outwardly and inwardly directed surfaces for defining an axis of elongation, first and second ends, and an internal shoulder on the inwardly directed surface for contacting a male end of a pipe to be coupled with said pipe coupler;

a pipe-attachment device comprising an axially-extending wall means for extending away from a concrete form wall, said axially-extending wall means defining a radially outwardly directed surface for tightly contacting said internal radially inwardly directed surface of said pipe-coupler wall and holding thereto by friction, but allowing said pipe coupler to be removed therefrom if sufficient axial force is applied thereto, said pipe-attachment device further comprising a floor means at a first end of said axially-extending wall means for being attached to said concrete form wall to thereby support said axially-extending wall means with a second end thereof extending away from said form wall; and

an intumescent collar wrapped about the external radially outwardly directed surface of said pipe coupler at said first end for expanding in response to heat for closing off said first end of said pipe coupler;

said radially outwardly directed surface of said pipe attachment device being sufficiently axially long and shaped and sized to tightly fit said internal radially inwardly directed surface of said pipe coupler such that said floor means of said pipe attachment device can be affixed to said form wall to become a part thereof and thereafter said first end of said pipe coupler can be pressed down onto said pipe attaching device to be held in place on said form wall during the pouring of concrete into said form wall and

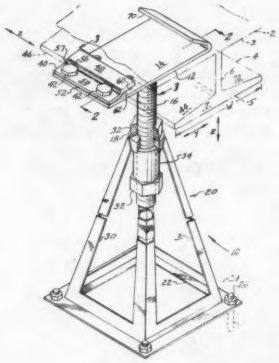
after the concrete is cured, the form wall can be removed while leaving the attachment device affixed to the form wall with an end of said intumescent collar being exposed.

4,882,887

MOBILE HOME ANCHOR

Charles E. Giles, Grand Terrace, and Richard J. Clifton, Ontario, both of Calif., assignors to C & R Pier Manufacturing, Riverside, Calif.

Filed Jun. 30, 1988, Ser. No. 213,908
Int. Cl.[4] E02D *27/48*
U.S. Cl. 52—126.6 **21 Claims**



1. An anchor apparatus for a mobile building structure having a body member rigidly supported on a frame member, the frame member having a flange member extending therefrom and spaced from the body member, the flange member having a first side edge, the apparatus comprising:

(a) a support member having a supporting surface for contacting the frame member;

(b) means for fixedly securing the support member to a grounded footing;

(c) a clamp member having at least one blade member; and

(d) fastener means for connecting the clamp member to the support member,

the blade member being adapted for locally deforming the flange member along a line intersecting the first side edge in response to tightening of the fastener means for preventing relative movement between the frame member and the support member in a direction parallel to the first side edge.

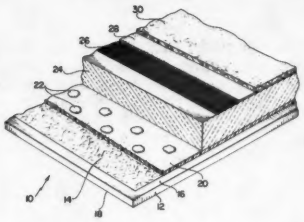
4,882,888

LAMINATED WALL CONSTRUCTION

William C. Moore, Holliston, Mass., assignor to Dryvit System, Inc., Warwick, R.I.

Filed Nov. 14, 1988, Ser. No. 271,028
Int. Cl.[4] E04C *2/00*
U.S. Cl. 52—309.9 **3 Claims**

1. A laminated wall construction for building exteriors comprising a gypsum substrate, one surface of which is adapted to be secured to a building structure, a non woven fiberglass matte substantially completely covering the opposite surfaces of said substrate, and an insulating layer secured to the fiberglass surface opposite to said one surface by a cementitious adhesive, the improvement comprising a water-based, water-resistant coating completely covering said opposite surface to effectively enhance the bond between said fiberglass matte with said substrate, to protect the fiberglass from alkali attack that would normally result from the cementitious adhesive, to



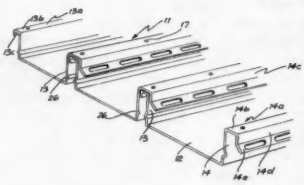
enhance the bond between said insulating layer and said opposite surface, and to increase the water resistance of said bonds.

4,882,889

COMPOSITE STRUCTURES

Christopher L. Healy, Seven Hills, and Ken Rankin, Kellyville, both of Australia, assignors to Monier Limited, Australia

Filed Feb. 26, 1988, Ser. No. 161,025
Claims priority, application Australia, Feb. 26, 1987, P10550
Int. Cl.[4] E04B *5/40*
U.S. Cl. 52—336 **13 Claims**



1. A composite structure comprising a plurality of support members arranged to form a decking member within a concrete slab, said support members comprising a pair of flange members joined by an imperforate connecting web member, at least one flange member located above said web member, said flange member including a lip portion having a plurality of apertures positioned so that part of the concrete of the slab is retained within the apertures by the web member during setting of the concrete.

4,882,890

METHOD AND APPARATUS FOR SEALING EXPANDABLE ROOF JOINTS WITH OPTICAL INSULATION

Michael C. Rizza, 2863 Encina Camino, Walnut Creek, Calif. 94598

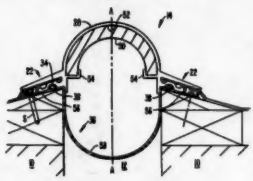
Filed May 27, 1988, Ser. No. 199,988
Int. Cl.[4] E04B *1/62*
U.S. Cl. 52—396 **17 Claims**

1. A weather seal of the type used to seal an expandable joint between adjacent building sections secured to the building sections with the aid of a clamping bar or beam comprising:

an elastomeric outer seal;

first receiving means in said elastomeric outer seal for receiving a portion of said building sections;

second receiving means in said elastomeric outer seal for receiving a clamping bar; and



third receiving means in said elastomeric outer seal for receiving applied continuous sealant material.

4,882,891

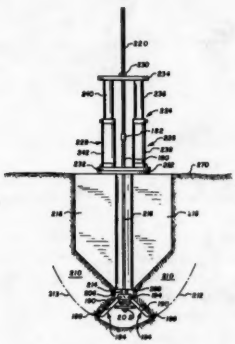
ANCHORING AND FOUNDATION SUPPORT APPARATUS HAVING MOMENT RESISTING VANES AND METHOD

Samuel J. Sero, Pittsburgh; James S. Collins, Monaca, and Victor Yates, Sewickley, all of Pa., assignors to S.A.F.E., Aliquippa, Pa.

Continuation-in-part of Ser. No. 878,859, Jun. 26, 1986, abandoned, which is a continuation-in-part of Ser. No. 647,172, Sep. 4, 1984, abandoned. This application Mar. 15, 1988, Ser. No. 168,261

Int. Cl.[4] E04H *12/20*

U.S. Cl. 52—742 **19 Claims**



1. A method for installing an anchor or foundation device in the earth comprising preparing a hole in the earth, lowering into said hole an anchor or foundation device having swingable media facing plates, said plates having media facing surfaces with upper and lower edges and equipped with oppositely disposed rib means extending along said upper and lower edges, applying force to swing said plates and said rib means outwardly into the surrounding media, during said swing said rib means cooperating with the media facing surfaces of said plates to contain respective plugs of the surrounding media to consolidate said media, and forcing a hollow tube assembly having a plurality of moment resisting vanes extending radially outwardly therefrom into said media around said device.

4,882,892

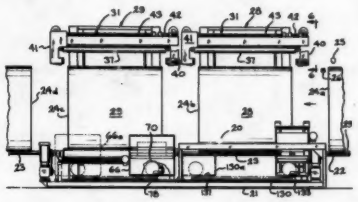
DUAL STATION WRAPPING MACHINE

David J. Pienta, Temperance, Mich., assignor to Automatic Handling, Inc., Erie, Mich.

Filed Apr. 24, 1989, Ser. No. 342,108

Int. Cl.[4] B65B *11/04, 41/16*

U.S. Cl. 53—176 **9 Claims**



1. A dual station wrapping machine for serially wrapping a roll having a longitudinal axis of rotation and side edges, comprising, conveyor means for receiving a roll to be wrapped, such longitudinal axis of rotation lying in a generally horizontal plane, transfer means for moving such roll from the conveyor to predetermined positions, support and drive means for cooperating with said transfer means and for rotating such roll about its horizontally positioned axis, hold down means for engaging such roll at the approximate longitudinal centerline of such roll, a first station at a first of said predetermined positions including means fixedly mounted for feeding and wrapping a wrapping material layer around one end of such roll and means movable axially relative to such roll for feeding and wrapping a wrapping material layer around such roll and a second station at a second of said predetermined positions spaced from said first predetermined position including means movable axially relative to such roll for feeding and wrapping a material layer helically around such roll, table means for receiving a layer of wrapping material from one of said stations, said table means being pivotable from a generally horizontal position to a position adjacent the roll.

4,882,893

CONTAINER FOR THE TRANSPORT OF DIAGNOSTIC SPECIMENS

Herbert C. Spencer, R.R. #1, Millet, Alberta, Canada T0C 1Z0 , and James G. McKay, 2003, 11507 - 124 Street, Edmonton, Alberta, Canada T5M 0K5

Filed Aug. 29, 1988, Ser. No. 237,966

Claims priority, application Canada, Feb. 26, 1988, 559969

Int. Cl.[4] B65B *23/22, 11/58, 5/10*

U.S. Cl. 53—449 **15 Claims**

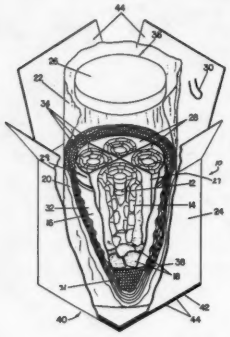
1. A method of packaging vials containing diagnostic specimens for purposes of transport, comprising the steps of:

a. firstly, wrapping a vial in shock absorbing material;

b. secondly, inserting said vial wrapped in shock absorbing material in a pressure vessel, said pressure vessel having moisture absorbing material lining the bottom;

c. thirdly, wrapping the sides of said pressure vessel with a plurality of layers of cardboard;

d. fourthly, shielding the top and bottom of said pressure vessel with a plurality of layers of cardboard; and



e. fifthly, sealing said pressure vessel with cardboard wrap and shielding in a cardboard box.

4,882,894

AGENT FOR IMPARTING ANTISTATIC CHARACTERISTICS TO A THERMOPLASTIC POLYMER AND A THERMOPLASTIC POLYMER COMPOSITION CONTAINING THE AGENT

Marvin R. Havens, and Joseph R. Lovin, both of Greer, S.C., assignors to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Oct. 14, 1986, Ser. No. 918,451
Int. Cl.[4] B65B *29/00*
U.S. Cl. 53—461 **12 Claims**

1. A method for protecting wrapped static sensitive devices from electrostatic charges comprising:

a. providing a wrap comprising an antistatic film having one or more layers, wherein at least one layer comprises a composition of a thermoplastic polymer in admixture with an antistatic agent wherein said polymer comprises nylon and said antistatic agent comprises aromatic sulfonamide that is substantially non-hygroscopic and substantially non-migratable; and

b. enclosing said wrap about a selected device.

4,882,895

AUTOMATED APPARATUS FOR TRANSPORTING, LINING-UP AND STOWING CYLINDRICAL FRAGILE BODIES

Min-Lang Hsieh; Jan-Hong Huang; Lian Jan, and Gang-Shyr Guan, all of Hsinchu Hsien, Taiwan, assignors to Industrial Technology Research Institute, Hsinchu Hsien, Taiwan

Filed May 24, 1988, Ser. No. 198,121
Int. Cl.[4] B65B *35/30*
U.S. Cl. 53—531 **10 Claims**

1. An automated apparatus for transportating, lining-up and stowing cylindrical fragile bodies comprising: a first receiving means for receiving a supply of cylindrical fragile bodies,

means for supplying receptacles;

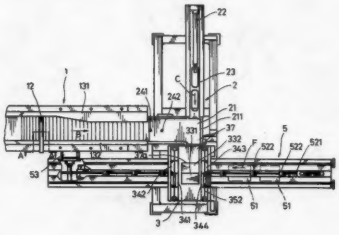
means for transporting cylindrical fragile bodies coming from said first receiving means;

means for accommodating cylindrical fragile bodies coming from said transporting means temporarily, and pushing them out in lots and in a predetermined sequence;

second receiving means for receiving cylindrical fragile bodies pushed out from said accommodating means and stowing them into receptacles coming from said supplying means;

means for elevating the receptacles coming from said supplying means and holding them temporarily near said second receiving means; and

means for controlling all the processes of the automated



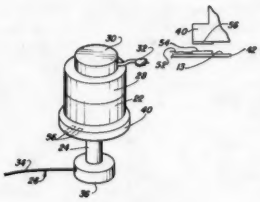
apparatus for transporting, lining-up and stowing cylindrical fragile bodies, said controlling means being coupled to said transporting, accommodating, receiving and elevating means.

4,882,896

LAWN MOWER

Roy E. Wilcox, 7182 E. Carpenter, Davison, Mich. 48423

Filed Apr. 11, 1988, Ser. No. 179,673
Int. Cl.[4] A01D *34/78*
U.S. Cl. 56—10.5 **6 Claims**



1. A lawn mowing device comprising

a housing having a top, a bottom, and a cutting chamber open to said bottom,

a plurality of wheels rotatably mounted to said housing for supporting said housing on a ground surface,

an electric motor having an output shaft,

an electric battery mounted to said electric motor and means for electrically connecting said battery to said motor,

a lawn cutting element secured to said output shaft,

means for detachably securing said motor to said housing so that said cutting element is positioned in said cutting chamber and

a battery charger mounted to said motor having means for electrically connecting said battery charger to household current, said battery charger being electrically connectable to household current when said motor is detached from said housing.

5. A lawn mowing device comprising

a housing having a top, a bottom, and a cutting chamber open to said bottom,

a plurality of wheels rotatably mounted to said housing for supporting said housing on a ground surface,

an electric motor having an output shaft,

an electric battery and means for electrically connecting said battery to said motor,

a lawn cutting element secured to said output shaft,

means for detachably securing said motor to said housing so

that said cutting element is positioned in said cutting chamber,

a push bar mounted to said housing,

a switch mounted to said push bar, and

wherein said electrical connecting means having means for automatically electrically connecting said switch in series between said motor and said battery upon attachment of said motor to said housing.

4,882,897

CLUTCH CONTROL STRUCTURE FOR A WALKING OPERATOR TYPE LAWN MOWER

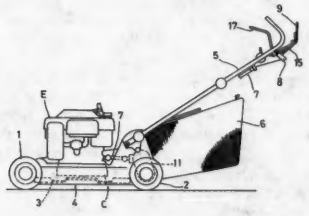
Hiroshi Oshima; Hirofumi Sadakane; Takao Katayama; Jinnosuke Takakura, and Hisatake Fujioka, all of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Nov. 21, 1988, Ser. No. 274,116

Claims priority, application Japan, Nov. 28, 1987, 62-301168; Nov. 30, 1987, 62-304318

Int. Cl.[4] A01D *69/00*

U.S. Cl. 56—11.3 **10 Claims**



1. A clutch control structure for a walking operator type lawn mower comprising

a cutting blade clutch (C) for making and breaking drive transmission to a cutting blade (3),

a steering handle (5) including a grip portion (5a),

a clutch lever (9) pivotable between a first position and a second position,

a control device (8) operatively connected to said cutting blade clutch (C) and pivotable between a first corresponding position corresponding to said first position for engaging said cutting blade clutch (C) and a second corresponding position corresponding to said second position for disengaging said cutting blade clutch (C), said control device (8) being constantly urged to said second corresponding position for disengaging said cutting blade clutch (C), and

an interlocking member (14) manually switchable between a release position for breaking an engagement between said control device (8) and said clutch lever (9) to allow said control device (8) and said clutch lever (9) to be operable independently of each other, and an operative position for establishing the engagement between said control device (8) and said clutch lever (9) to allow said control device (8) and said clutch lever (9) to be operable together, said interlocking member (14) being constantly urged to said release position,

wherein said cutting blade clutch (C) is engaged by maintaining said interlocking member (14) in said operative position and moving said clutch lever (9) to said first position.

4,882,898

CONNECTING LINK STRUCTURE FOR A LAWN MOWER

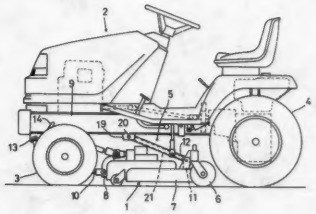
Kazuo Samejima; Hironori Tsuchihashi; Tsuyoshi Sato; Toshihiko Hamada; Hideo Kida, and Kiyoto Kasamatsu, all of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan

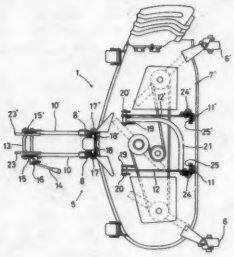
Filed Apr. 10, 1989, Ser. No. 335,912

Claims priority, application Japan, Jul. 20, 1988, 63-180605

Int. Cl.[4] A01D *34/54*

U.S. Cl. 56—208 **7 Claims**





1. A connecting link structure for connecting a grass cutting unit to a vehicle body, comprising first and second link means each pivotally connected at one end thereof to said vehicle body and at the other end thereof to said grass cutting unit, and a bracing auxiliary link disposed between said first and second link means, said auxiliary link being secured at one end thereof to a pivotal axis region of the first link means adjacent said grass cutting unit and connected at the other end thereof to a pivotal axis of the second link means adjacent the vehicle body.

4,882,899

HARVESTER REEL TINE AND BAT ASSEMBLY

Edward P. Jasper, and Thomas G. Truckenbrod, both of Mendota, Ill., assignors to HCC, Inc., Mendota, Ill.

Filed Jun. 15, 1988, Ser. No. 206,828

Int. Cl.[4] A01D *57/02*

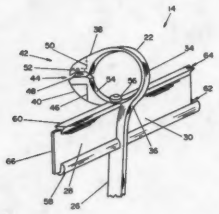
U.S. Cl. 56—220 **11 Claims**

1. A one piece molded harvester reel tine for mounting on a support tube comprising:

a split ring section forming a ring with a single split and with an interior diameter approximately equal to the outside diameter of a support tube onto which it is to be mounted, the split ring section including a connector section at which two end sections of the split ring meet to form the split, each end section having a through hole, with the two through holes in alignment when the two end sections are adjacent to each other and a flexible band section of a cross sectional configuration such that the band section will flex sufficiently to permit the two end sections to separate a distance greater than the diameter of the split

ring when closed without permanently deforming the flexible band section wherein the flexible band section comprises a smooth continuous section of at least one-half the circumference of the split ring section;

a finger section the base of which is protruding from the outside surface of the split ring section in an orientation approximately radial to the circle of the split ring section and in a location on the exterior of the split ring section approximately one quarter of the circumference of the



split ring section away from the split in the split ring section; and

a protrusion from the inside surface of the circle of the split ring section, extending inward from the split ring section at the location of the finger section, the protrusion having a dimension inward toward the center of the split ring section which is at least as great as the wall thickness of a support tube onto which the split ring section is to be mounted.

4,882,900

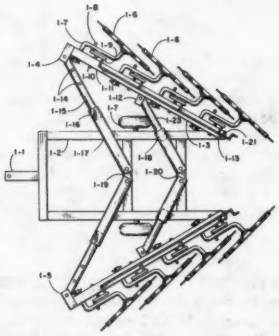
BI-FOLD HAY RAKE SYSTEM

Melvin C. Kuehn, Rte. 3, Box 272, Aitkin, Minn. 56431

Filed Feb. 24, 1988, Ser. No. 126,690

Int. Cl.[4] A01D *78/08*

U.S. Cl. 56—377 **4 Claims**



1. A wheel rake system comprising, in combination, a wheeled transport frame and articulated wheel rake means mounted thereon, said rake system being characterized in that:

(a) said wheeled transport frame comprises a pair of longitudinally disposed side rails having a pair of cross members extending therebetween and axle shaft means with transport wheels journably mounted for rotation thereon coupled to and supporting said transport frame;

(b) said articulated wheel rake means includes a pair of individual wheel rake assemblies operatively mounted one on either side of said wheeled transport frame and with wheel rake assembly articulation means coupling each of said wheel rake assemblies to said transport frame and arranged to accommodate pivotal folding of each of said wheel rake assemblies outwardly to a working position and inwardly to a transport position;

(c) each of said wheel rake assemblies comprises an elongated support beam, a plurality of longitudinally spaced-apart tined wheel rakes coupled to said elongated support beam and including wheeled rake support means arranged for adjustably positioning the working height of said wheel rakes along said elongated supported beam;

(d) each of said elongated support beams being pivotally coupled to said wheeled transport frame at a rearward pivotal mounting point adjacent the rear ends of said elongated support beams and said wheeled transport frame respectively, and arranged for arcuate pivotal outward rotational movement about said pivotal mounting point, at least one laterally extending support arm assembly pivotally secured to said transport frame forwardly of said rearward pivotal mounting point between said wheeled transport frame and each of said elongated support beams for determining and controlling the outward pivotal rotational position of said elongated support beam relative to said wheeled transport frame;

(e) each of said lateral support arm assemblies comprising a pair of cooperating telescopically engaged length adjustable support braces with opposed ends of each of said support arm assemblies being pivotally secured to said elongated support beam and a cross member of said wheeled transport frame respectively, with the adjusted length of each of said support arm assemblies operating to determine the extent of outward angular rotational movement of said elongated support beam relative to said wheeled transport frame to thereby vary the working width of the wheel rake system;

(f) said wheel rake transport means further comprising:

(1) a wheel rake support crank shaft with an upper end segment, a lower end segment, and an intermediate segment therebetween, and with the said upper segment being pivotally engaged with said elongated support beam, and with said lower segment journably supporting one of said tined wheel rakes thereon; and

(2) a threaded wheel rake height control shaft, a tined rake height adjust actuating arm comprising first and second angularly disposed arm elements joined together at an apex and with the apex zone having pin means rotatably engaged with one of said elongated support beams for coupling each of said actuating arms thereto, and with the outer end of the first one of said angularly disposed arm elements of each height adjust actuating arm having a laterally outwardly extending support pin secured thereto for underlying, engaging and supporting the intermediate segment of said wheel rake support crank shaft thereover, and with the outer end of said second height adjust actuating arm being pivotally coupled to a threaded wheel rake height control shaft mounted for adjustable longitudinal positioning along said elongated support arm, the arrangement being such that the longitudinal position of said height control shaft along said elongated support arm determines the angular position of each of said height adjust actuating arm elements and thus the height of each of said tined wheel rakes from the ground surface.

4,882,901

DETACHABLE LINK CHAIN

James M. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, New Orleans, La.

Division of Ser. No. 858,597, May 1, 1986, Pat. No. 4,815,271. This application Nov. 23, 1988, Ser. No. 276,361

Int. Cl.[4] F16G *13/12*

U.S. Cl. 59—84 **6 Claims**

1. A module of integrally molded plastic for forming a conveyor belt by interconnecting a plurality of such modules, each of said modules comprising:

a plurality of link elements integrally molded side-by-side and extending longitudinally between first and second ends, each link element comprising:

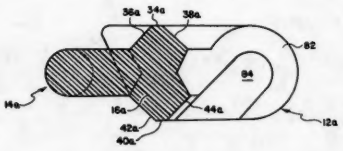
at least one intermediate portion extending transverse to said longitudinally extending link element;

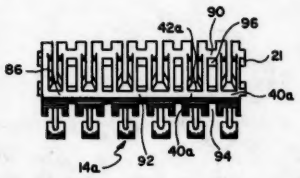
first and second spaced apart sidewalls integrally molded with and connected by said intermediate portion, and each sidewall extending to said first end and having an inside and outside surface;

a longitudinal portion extending toward said second end and having a preselected transverse width at said second end, said longitudinal portion integrally molded with said intermediate portion;

a transversely extending pivot member integrally molded with and disposed on said longitudinal portion and having a preselected length, said preselected length of said pivot member selected to be larger than said preselected transverse width of said longtudinal portion, said tranversely extending pivot member defining a first pivot axis;

said first and second sidewalls defining first and second pivot member receiving areas integrally formed on corresponding ones of said first and second sidewalls, said inside surface of said sidewalls defining therebetween a transversely extending gap having a preselected lateral dimension, said preselected lateral dimension of said transversely extending gap selected to be no smaller than said transverse width of said longitudinal portion integrally molded with said central portion, said pivot member receiving areas defined by said first and said second sidewalls further defining a second pivot axis;





said preselected length of said transversely extending pivot member selected to be larger than said preselected lateral dimension defined between the inside surfaces of said sidwalls such that said pivot member and said receiving areas cooperate to pivotally join a pair of said link elements;

at least one connecting member connecting adjacent ones of said plurality of link elements, said connecting member being integrally molded with said link elements; and

a tooth integrally formed with said intermediate portion for driving said plurality of link elements at multiple points as a conveyor belt.

4,882,902

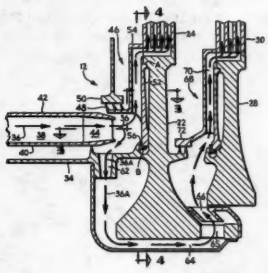
TURBINE COOLING AIR TRANSFERRING APPARATUS

James R. Reigel; Robert J. Corsmeier; James H. Bertke, and Dean T. Lenahan, all of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Continuation of Ser. No. 857,282, Apr. 30, 1986, abandoned. This application Mar. 7, 1988, Ser. No. 168,522

Int. Cl.[4] F02C *3/00*; F01D *5/14*

U.S. Cl. 60—39.75 **4 Claims**



1. A gas turbine engine cooling air transferring means including a turbine disk from which blades project radially into a hot gas stream; a compressor effective for providing pressurized cooling air; and a cooling air transferring apparatus for transferring cooling air from the compressor to the turbine disk, separate from the hot gas stream, wherein the cooling air transferring means comprises in combination:

an inducer means effective for channeling the cooling air in a direction substantially tangential to said turbine disk;

a radial impeller means for receiving said cooling air and conveying it to said blades;

said impeller means comprising a plurality of radial passages enclosed within said impeller for receiving the cooling air and a mounting means for mounting said impeller to said turbine disk; and

wherein said impeller means includes an annular forward facing side and an annular rearward facing side wherein one side is mountable to the turbine disk and the other side includes an annular air seal.

4,882,903

COMBINED CYCLE WASTE-TO-ENERGY PLANT

William L. Lowry Jr., Yukon, Okla.; Maurice G. Woods, 4301 St. George Dr., Oklahoma City, Okla. 73120, and Charles A. Martin, Oklahoma City, Okla., assignors to CH Guernsey & Company, Oklahoma City; Maurice G. Woods, Oklahoma City; Teresa J. Woods, Oklahoma City and Applied Thermal Systems, Inc., Oklahoma City, all of, Okla.

Filed Apr. 1, 1988, Ser. No. 176,782

Int. Cl.[4] F02C *6/18*

U.S. Cl. 60—39.182 **21 Claims**

1. A solid waste-to-energy conversion plant comprising:

a building enclosure having a receiving area for receiving and storing solid waste, a waste fuel processing area, a waste incineration area, and a waste combustion heat recovery area;

incinerator means, positioned in said waste incineration area, for receiving refuse derived fuel, and for receiving hot exhaust gas from a source thereof, utilizing the received hot exhaust gas to support combustion of the received refuse derived fuel, and responsively generating hot combustion gases;

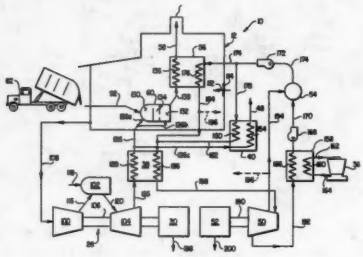
fuel processing means, positioned in said waste fuel processing area, for converting solid waste received in said receiving area to refuse derived fuel;

conveying means for conveying refuse derived fuel from said waste fuel processing area to said incinerator means;

incinerator heat recovery boiler means, positioned in said waste combustion heat recovery area, for receiving said hot combustion gases from said incinerator means and water from a source thereof and utilizing the hot combustion gases to convert the water to saturated steam;

waste heat recovery boiler means for receiving hot exhaust gas and utilizing the same to convert water received by said waste heat recovery boiler means to saturated steam;

steam superheater means for receiving hot exhaust gas, and saturated steam from said incinerator heat recovery boiler means and said waste heat recovery boiler means, and responsively generating superheated steam;



steam turbine and generator means for receiving said superheated steam and responsively generating electrical power and discharging saturated steam;

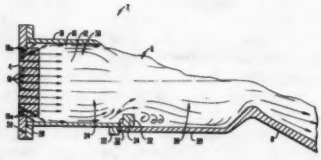
condensate/feedwater means for receiving saturated steam from said steam turbine and generator means and responsively flowing condensed water to said incinerator heat recovery boiler means and said waste heat recovery boiler means; and

combustion turbine and generator means for drawing air from the interior of said building enclosure in a manner maintaining it at a negative pressure, mixing the air with fuel from a source thereof, burning the air-fuel mixture, and responsively generating electrical power and flowing hot exhaust gas through said steam superheater means and into said incinerator means and said waste heat recovery boiler means.

4,882,904

TWO STAGE ROCKET COMBUSTOR

Leonard Schoenman, Citrus Heights, Calif., assignor to Aerojet-General Corporation, La Jolla, Calif.

Filed Mar. 24, 1988, Ser. No. 172,622
Int. Cl.[4] F02K *9/42*
U.S. Cl. 60—258 **10 Claims**

1. A rocket engine comprising:

a. a primary combustion chamber defined by a first peripheral wall constructed of a first material adapted to withstand a relatively lower temperature;

b. a secondary combustion chamber defined by a second peripheral wall constructed of a second material adapted to withstand a relatively higher temperature and joined axially to an end of the primary chamber;

c. a propellant injector joined to another end of the primary chamber having a plurality of orifices for directing a fuel and an oxidizer toward the secondary chamber so that a first portion of fuel and oxidizer forms a core flow through the primary chamber where they mix with each other and so that a second portion of at least one of the fuel and the oxidizer forms an unmixed curtain flow along the first wall; and

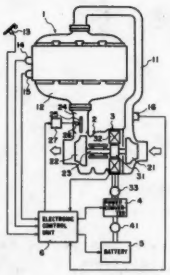
d. means for deflecting the curtain flow from a point on the first wall proximate the one end thereof toward the core flow for mixing the curtain flow with the core flow and causing the full combustion of the at least one of the fuel and the oxidizer in the curtain flow at a location radially inward of the second wall.

4,882,905

DEVICE FOR CONTROLLING TURBOCHARGER WITH ELECTRIC ROTARY MACHINE

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Jul. 28, 1988, Ser. No. 225,255
Claims priority, application Japan, Jul. 29, 1987, 62-189740
Int. Cl.[4] F02B *37/00*
U.S. Cl. 60—608 **5 Claims**



1. A device for controlling a turbocharger with an electric rotary machine, comprising:

a turbine mounted on an engine on a motor vehicle and drivable by exhaust gases emitted from the engine;

a rotatable shaft coupled to said turbine;

a compressor coupled to said rotatable shaft for delivering air under pressure to said engine;

an electric rotary machine coupled to said rotatable shaft;

an engine speed sensor for detecting the rotational speed of the engine;

an accelerator pedal movement sensor for detecting the amount of depression of an accelerator pedal which controls operation of said engine;

a boost pressure sensor for detecting the pressure of air supplied to said engine;

a turbine speed sensor for detecting the rotational speed of said turbine;

a battery mounted on said motor vehicle;

means for calculating a required boost pressure based on signals from said engine speed sensor and said accelerator pedal movement sensor;

means for comparing said required boost pressure and a boost pressure generated from the turbocharger by the energy of exhaust gases emitted from the engine and corresponding to the rotational speed of the engine; and

means for driving said electric rotary machine as a motor and supplying said electric rotary machine with electric power from said battery which corresponds to the differ-

ence between said required boost pressure and said boost pressure generated by the turbocharger if said required boost pressure is higher than said boost pressure generated by said turbocharger,

wherein said means for driving and supplying said electric rotary machine includes means for adding electric power corresponding to the rotational speed signal from said turbine speed sensor and electric power having a value produced by subtracting the boost pressure, to calculate electric power which is required to be supplied to said electric rotary machine.

4,882,906

ENGINE BRAKING SYSTEM

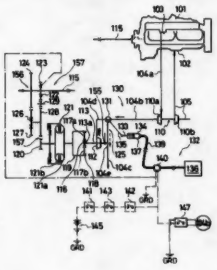
Shigeo Sekiyama, and Masaki Okada, both of Kawasaki, Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,923

Claims priority, application Japan, May 22, 1987, 62-123941; May 30, 1987, 63-136474

Int. Cl.[4] F02G *5/00*

U.S. Cl. 60—624 **27 Claims**



1. An engine braking system for use with an engine provided with a rotatable output shaft, an accelerator, an exhaust passage, and a clutch and transmission coupled with the engine, the system comprising:

nozzle means disposed in the exhaust passage of the engine and defining a nozzle throat area;

a power turbine disposed in the exhaust passage downstream of the nozzle means;

throttling means for changing the nozzle throat area of said nozzle means; and,

driving force transmitting means for connecting the output shaft of the engine to the power turbine so as to transmit rotative power of said output shaft to said power turbine when the accelerator is released to decelerate the engine, the clutch is engaged, the transmission is engaged and the nozzle throat area is reduced by the throttling means.

4,882,907

SOLAR POWER GENERATION

William G. Brown, II, 720 NW 31st St., Corvallis, Oreg. 97330

Continuation-in-part of Ser. No. 765,824, Aug. 14, 1985, abandoned, which is a division of Ser. No. 486,087, Apr. 18, 1983, Pat. No. 4,549,604, which is a continuation-in-part of Ser. No. 122,357, Feb. 14, 1980, abandoned, which is a continuation-in-part of Ser. No. 816,501, Jul. 17, 1977, abandoned, which is a continuation-in-part of Ser. No. 788,207, Apr. 18, 1977, abandoned. This application Apr. 27, 1988, Ser. No. 186,919

Int. Cl.[4] F01K *25/06*

U.S. Cl. 60—649 **8 Claims**

1. An absorption process comprising:

injecting a stream of water into a flash chamber to evaporate a fraction of said stream of water to produce steam and to chill the remainder;

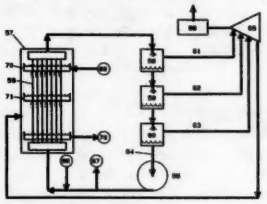
removing and discharging as blowdown a portion of said remainder of said water stream to reduce the accumulation of dissolved solids in said water;

passing at least a major portion of said steam into an absorber chamber;

injecting a rich desiccant into a first portion of said absorber chamber to absorb steam, release heat and produce an intermediate-strength desiccant;

passing said intermediate-strength desiccant into a second portion of said absorber chamber located downstream of said first portion to prevent significant backmixing of weakened desiccant from said second portion into said first portion of said absorber chamber;

absorbing at least a portion of said injected steam into said intermediate-strength desiccant to release heat from said intermediate desiccant and to produce a weakened desiccant.



thermally contacting a stream of water with said desiccant in said second portion of said absorber chamber to transfer a major portion of said heat released from said second portion to said water to produce a warmer stream of water.

thermally contacting said warmer stream with said desiccant in said first portion of said absorber chamber to transfer a major portion of said released heat from said first portion to said warmer stream and to produce a still warmer stream of water.

removing at least a portion of said weaked desiccant from said absorber chamber.

4,882,908

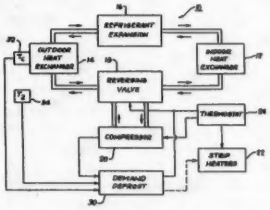
DEMAND DEFROST CONTROL METHOD AND APPARATUS

Lee A. White, Keller, Tex., assignor to Ranco Incorporated, Dublin, Ohio

Filed Jul. 17, 1987, Ser. No. 74,907

Int. Cl.[4] F25D *21/06*

U.S. Cl. 62—155 **22 Claims**



1. A method of defrosting an outdoor heat exchanger of a compressor-condenser-evaporator type heat pump unit in accordance with sensed conditions indicative of the need to perform a defrost cycle comprising:

(a) sensing the temperature of the outdoor heat exchanger;

(b) sensing the outdoor air temperature;

(c) monitoring compressor running time until a predeter-

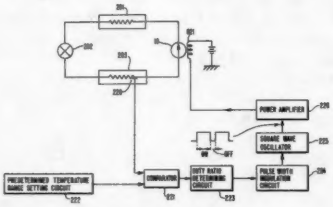
mined accumulated running time that varies as a function of outdoor air temperature has elapsed;
(d) enabling defrosting of the outdoor heat exchanger when said running time has elapsed;
(e) detecting the extent of the temperature differential between the sensed outdoor heat exchanger temperature and the sensed outdoor air temperature;
(f) determining a value indicative of the frosting condition of the heat exchanger which valve varies as a function of outdoor air temperature;
(g) comparing the value with the sensed temperature differential;
(h) enabling a defrosting cycle when the sensed temperature differential and the value bear a predetermined relationship to each other; and,
(i) initiating a defrost cycle only when enabled by said compressor running time elapsing and enabled by said sensed temperature differential bearing a predetermined relationship to said value.

4,882,909

REFRIGERATING SYSTEM HAVING A COMPRESSOR WITH AN INTERNALLY AND EXTERNALLY CONTROLLED VARIABLE DISPLACEMENT MECHANISM

Kiyoshi Terauchi, Isesaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Sep. 22, 1988, Ser. No. 247,605
Claims priority, application Japan, Sep. 22, 1987, 62-236315
Int. Cl.[4] F04B *1/00*; F25B *1/00*
U.S. Cl. 62—209 **16 Claims**



1. In a refrigerating system including a refrigerant circuit, comprising a condenser, evaporator and compressor, the compressor including a compressor housing having a central portion, a front end plate at one end and a rear end plate at its other end, said housing having a cylinder block, a piston slidably fitted within each of said cylinders, a drive mechanism coupled to said pistons to reciprocate said pistons within said cylinders, said drive mechanism including a drive shaft rotatably supported in said housing, a rotor coupled to said drive shaft and rotatable therewith, and coupling means for drivingly coupling said rotor to said pistons such that the rotary motion of said rotor is converted into reciprocating motion of said pistons, said coupling means including a member having a surface disposed at an incline angle relative to said drive shaft, said incline angle of said member being adjustable to vary the stroke length of said pistons and the capacity of said compressor, said rear end plate having a suction chamber and a discharge chamber, variable displacement control means for controlling angular displacement of said adjustable member, comprising first valve control means for controlling fluid communication between said crank chamber and said suction chamber in response to changes in refrigerant pressure in said compressor, said first valve control means comprising a first passageway providing fluid communication between said crank chamber and said suction chamber and first valve means for controlling the opening and closing of said first passageway to vary the capacity of the compressor by adjusting the incline angle, said first valve means comprising a first valve to directly open and close said first passageway, said variable displacement control means further comprising second valve control means for controlling fluid communication between said crank chamber and said suction chamber in response to a signal generated outside of the compressor, said second valve control means comprising a second passageway providing fluid communication between said crank chamber and said suction chamber and second valve means for controlling the opening and closing of said second passageway to vary the capacity of said compressor by adjusting the incline angle, said second valve means comprising a second valve to directly open and close said second passageway and override the operation of said first valve, the improvement comprising:

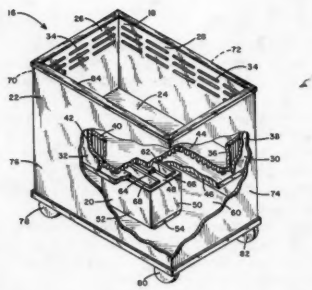
means for controlling the generation of said signal in response to at least one thermodynamic characteristic related to the evaporator as compared to two distinct boundary values, said signal generating control means comprising signal generating means for generating the signal, said signal generating means being responsive to predetermined range setting means for establishing a predetermined range of thermodynamic values in accordance with said two distinct boundary values, wherein the signal generating control means provides stepwise signal control within the predetermined range of the predetermined range setting means.

4,882,910

REFRIGERATION SYSTEM FOR PRODUCT DISPLAY ENCLOSURES

Kermit E. Meehan; William T. Nichols, both of Wayzata; Timothy S. Meehan, and Robert A. Essig, both of Minneapolis, all of Minn.

Filed Feb. 8, 1989, Ser. No. 308,142
Int. Cl.[4] A47F *3/04*
U.S. Cl. 62—256 **18 Claims**



1. A portable refrigeration apparatus including:
a refrigeration enclosure having an upper deck, lower deck, and an upright enclosure side wall means joined to said upper and lower decks; an inlet opening formed in said upper deck for admitting a fluid into said enclosure, and an outlet opening in said upper deck for discharging said fluid out of the enclosure; and a cooling means within said enclosure for cooling said fluid;
a display container including a container floor and an upright container side wall means joined to said floor; first and second openings formed in said floor spaced apart from one another and open to the exterior of said container; a first fluid passageway in said container side wall means in fluid communication with said first opening and with the interior of said container, and a second fluid passageway in said container side wall means in fluid communication with said second opening and with the interior of the container; and
a means forming a removable connection of said container and said enclosure, wherein said floor is contiguous with

said enclosure upper deck, and said first and second openings are in fluid communication with said inlet and outlet openings, respectively.

4,882,911

APPARATUS FOR REMOVING CONDENSATE WATER FROM A COMPRESSOR-OPERATED COOLING DEVICE

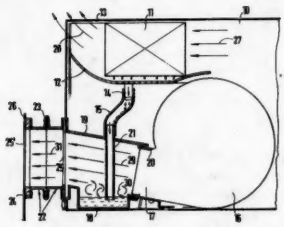
Manfred Immel, Mittenaar, Fed. Rep. of Germany, assignor to Rittal-Werk Rudolf Loh GmbH & Co. KG, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 255,762

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1987, 3735551

Int. Cl.[4] F25D *21/14*

U.S. Cl. 62—288 **4 Claims**



3. A device for removing condensate water from a compressor-operated cooling device having an evaporator and a condensate collecting pan mounted below the evaporator wherein condensate water accumulated during the condensation operation of said evaporator flows to a drip pan mounted below said condensate collecting pan on a base plate of the cooling device next to an outlet hole in one wall of the cooling device, a blower mounted on the side of said drip pan opposite the outlet hole, during the condensation operation, blows a warm air current in the direction of said outlet hole, over the surface of the condensate water collected in the drip pan, said device comprising: said drip pan **(18)** integrated as a pan-shaped curved concavity into a lower side of a closed air channel **(19)** which is tightly connected with an outlet connecting piece **(17)** of a blower **(16)** at one end and with an outlet hole **(25)** at an opposite end, said blower **(16)** being capable of supplying a warm air current **(29)** at a velocity sufficient to carry fluid droplets of the condensate water accumulated in said drip pan **(18)**;

said condensate collecting pan **(12)** having an outlet connecting piece **(14)**, said air channel **(19)** having an inlet pipe **(21)** transversely positioned through an internal space of said air channel **(19)** from an upper side of said air channel **(19)** to said drip pan **(18)** mounted on said lower side of said air channel **(19)**, said drip pan **(18)** connected with said outlet connecting **(14)** of said condensate collecting pan **(12)** by a flexible tube **(15)**; and

said air channel **(19)** and said inlet pipe **(21)** constructed as a single-piece plastic part which is connectable with said outlet connecting piece **(17)** of said blower **(16)** by a connecting mount **(20)**.

4,882,912

TEMPERATURE CONTROLLABLE TANK CONTAINER

Robin E. Fossey, Redhills, Ireland, assignor to Container Design Limited, Monaghan, Ireland

Filed Oct. 12, 1988, Ser. No. 256,824

Int. Cl.[4] F25D *19/00*

U.S. Cl. 62—297 **18 Claims**

1. A temperature controllable tank container comprising:

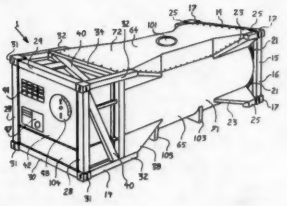
a pair of end frames,

a tank mounted between the end frames,

an insulating shell extending round the tank and substantially enclosing the tank, and abutting the tank along a lower portion of the tank,

two elongated side ducts for carrying a heat transfer medium in one direction along the tank being provided between the insulating shell and the tank, and disposed longitudinally relative to the tank, one of the side ducts being provided on one side of the tank and the other side duct being provided on the opposite side of the tank, the side ducts being provided in substantially similar locations on their respective sides of the tank and being separated by the portion of the insulating shell abutting the lower portion of the tank,

at least one other duct extending longitudinally along the



tank between the insulating shell and the tank for carrying the heat transfer medium in the other direction,

communicating means at one end of the tank to communicate the side ducts with the other duct, and

inlet and outlet means being provided to respective ducts at the other end of the tank for connecting the ducts to a heating or cooling means.

14. A tank container as claimed in claim **1** in which a cooling means provided by a refrigerating unit to cool the heat transfer medium is mounted in the end frame adjacent the inlet and outlet of the ducts, the refrigerating unit being connected to the inlet and outlet for circulation of the heat transfer medium through the side and top ducts, means to circulate the heat transfer medium being provided.

4,882,913

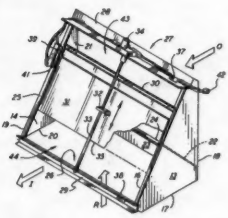
SLIDE PLATE ECONOMIZER

Nelon N. LaCount, II, Syracuse; Dilip Y. Vyavaharkar, Liverpool, and Rudy Bussjager, Chittenango, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Oct. 20, 1988, Ser. No. 260,228

Int. Cl.[4] F25D *17/04*; G05D *23/13*

U.S. Cl. 62—409 **24 Claims**



11. In an air conditioning system of the type having an economizer for selectively providing respective outdoor air discharge and return air discharge openings through which outdoor air and/or return air can flow to an evaporator coil, an improved sliding door mechanism comprising:

a door slideably mounted on an economizer and being so positioned and sized that on one extreme position it covers

the outdoor air discharge opening and uncovers the return air discharge opening and at its other extreme position it covers the return air discharge opening and uncovers the outdoor air discharge opening;

a threaded strut attached to said door and extending substantially normally therefrom;

a threaded shaft threadably engaging said threaded strut so as to cause linear movement thereof upon rotation of said shaft; and

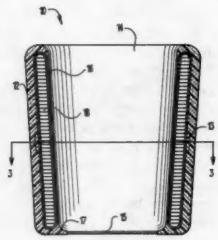
drive means to selectively rotate said threaded shaft so as to selectively position said door with respect to said return air discharge and outdoor air discharge openings, respectively.

4,882,914

BEVERAGE COOLER

Susan M. Haines-Keeley, 8101 83rd Ave., SW., B-12, Tacoma, Wash. 98498, and Wanita E. Haines, P.O. Box 1104, Havre, Mont. 59501

Filed Mar. 8, 1989, Ser. No. 320,518
Int. Cl.[4] F25D *3/08*
U.S. Cl. 62—457.4 **1 Claim**



1. A beverage cooler for holding and cooling a beverage container, comprising:

a frusto conical hollow body formed from an expandable resilient insulating material;

said body having an upper larger diameter open end and a smaller diameter bottom open end;

an annular rim formed adjacent said bottom end portion for supporting a bottom peripheral edge of a beverage container;

a plurality of discrete elongated generally axially extending receptacles spaced circumferentially in a frusto conical array and encapsulated within a side wall of said body, each of said receptacles filled with a freezable gel material;

each of said receptacles having an arcuate inner side wall for conformance with a cylindrical beverage container, said receptacles extending in a tapered frusto conical configuration tapering from a larger diameter adjacent said open upper end of said body and a smaller diameter adjacent said open bottom end of said body;

an elastic band secured around a mid portion of said receptacle, within said sidewall; and

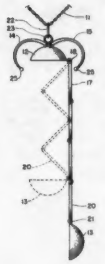
a pair of perpendicular elastic straps secured across said open bottom end of said body, whereby insertion of a cylindrical beverage container into said larger diameter open end and causes said receptacles to move into a cylindrical configuration, in close conformance with an exterior sidewall of the inserted container.

4,882,915

COMBINED LOCKET AND PHOTO HOLDER

Eileen L. Porcaro, 13608 Valleyheart Dr., Sherman Oaks, Calif. 91423

Filed Jun. 9, 1988, Ser. No. 204,298
Int. Cl.[4] A44C *15/00*
U.S. Cl. 63—19 **3 Claims**



1. An article of jewelry comprising:

a housing having a pair of identical half members;

a plurality of photo holders hingeably coupled together in end-to-end relationship;

said plurality of photo holders terminating at its opposite ends in end photo holders, each of which is hinged to a respective one of said housing half members;

said plurality of photo holders adapted to be folded over upon each other to form a stack between said housing half members constituting a storage position and to be extended in a line constituting an operative position exposing the opposite surfaces of each of said photo holders; and

means provided on each of said photo holders for mounting a photo so as to be visually exposed when said photo holders are in said operative position;

clasp means for releasably coupling said half members together separated by said stack of photo holders when in said storage position;

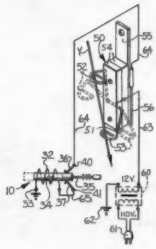
said clasp means includes a pair of pivotally mounted arcuate members extending about said stack of photo holders and having rounded ends in snap-lock engagement with receiving holes in said half members respectively.

4,882,916

KNITTING MACHINE STOP MOTION ACTIVATOR

Robert E. Jones, Rte. 4, Box 509, Conover, N.C. 28613

Filed Mar. 2, 1989, Ser. No. 317,969
Int. Cl.[4] D04B *35/12*
U.S. Cl. 66—163 **7 Claims**



1. In a knitting machine for forming knit fabric including

detector switch means normally positioned in an open position and being movable to a closed position when a malfunction of the knitting machine occurs, and stop motion means operable to stop operation of the knitting machine upon detection of a malfunction, the combination therewith of activator means operable by movement of said detector switch means to said closed position to operate said stop motion means, said activator means comprising

a solenoid coil,

a source of electrical energy,

a wiring circuit connecting said source of electrical energy to said solenoid coil and through said detector switch means,

an elongate armature core supported for axial movement within said solenoid coil, said armature core being moved to a first position within said solenoid coil when said solenoid coil is energized, and said armature core being manually movable to a second position when said solenoid coil is deenergized,

connector means operatively connecting said armature core with said stop motion means for stopping said knitting machine upon movement of said armature core to said first position, and

control switch means interposed in said wiring circuit between said detector switch means and said solenoid coil, said control switch means being operatively associated with said armature core and being moved to a closed position when said armature core is in said second position, and to an open position when said armature core is in said first position so that said solenoid coil is energized when said detector switch means is moved to said closed position and deenergized as soon as said armature core is moved to said first position.

4,882,917

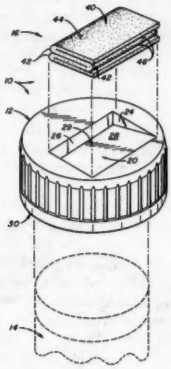
RINSE RELEASE LAUNDRY ADDITIVE AND DISPENSER

Eugene A. Mizusawa, Castro Valley; Donald J. Paone, Hayward; Tracey L. Casella, Martinez; Dorothy L. Flores, Livermore; Clement K. Choy; Jan Gerritsen, both of Walnut Creek; Ronald E. Heiskell, Tracy; Thomas G. Dewees, Pleasanton, and Jon L. Ellgen, Pleasant Hill, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed May 11, 1988, Ser. No. 193,310

Int. Cl.[4] D06F *39/02*

U.S. Cl. 68—17 A **19 Claims**



1. A wash additive combination for the rinse release of wash additives, comprising

(a) a dispensing means, positioned about an upper surface of a washing machine agitator, the dispensing means being adapted to retain a wash additive packet and to position the packet such that a center of mass thereof is offset from a center of rotation of said agitator whereby the packet is retained during an initial, wash phase of a wash cycle and dispensed during a spin phase of said wash cycle; and

(b) a wash additive packet for placement onto the dispensing means, the packet comprising a flexible substrate material and possessing a first stable conformation of a first outer surface area, and a second stable conformation of a second outer surface area, said second outer surface area being greater than said first outer surface area, the substrate having deposited thereon a dispersible wash additive for dispersion in an aqueous rinse solution.

4,882,918

PADLOCK COVER

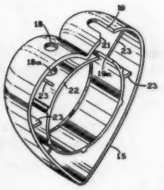
Judith A. Stanich, Pompano Beach, Fla., assignor to Hot Locks, Inc., Pompano Beach, Fla.

Continuation-in-part of Ser. No. 803,084, Nov. 27, 1985, Pat. No. 4,819,465, and a continuation-in-part of Ser. No. 802,767, Nov. 27, 1985, Pat. No. 4,744,229, which is a continuation of Ser. No. 618,685, Jun. 8, 1984, Pat. No. 4,555,920, which is a continuation-in-part of Ser. No. 554,903, Nov. 25, 1983, Pat. No. 4,534,190. This application Dec. 16, 1987, Ser. No. 133,553

The portion of the term of this patent subsequent to Dec. 3, 2002, has been disclaimed.

Int. Cl.[4] E05B *67/38*

U.S. Cl. 70—54 **20 Claims**



1. A cover for attachment to a padlock of the type having a body portion and an inverted, U-shaped shackle extending from the body portion, said cover having front and rear portions and including:

retaining means comprising an inner wall portion which is generally complementary to the shape of the body portion of the padlock and is adapted to prevent of the body portion of the padlock within said cover in a first plane defined by the shackle, wherein said inner wall portion includes at least one aperture adapted to permit the shackle to pass therethrough and which captures the shackle therein;

securing means adapted to prevent movement of the body portion of the padlock within said cover in a second plane perpendicular to the first plane, wherein said securing means includes at least one aperture adapted to permit the shackle to pass therethrough; and

a face plate adapted to enclose the face of the padlock.

4,882,919

FLUSH MOUNTED PANEL LOCK CONSTRUCTION

Clark E. Craig, Inman, S.C., assignor to Valhi Inc., Dallas, Tex.

Filed Jul. 7, 1988, Ser. No. 216,324

Int. Cl.[4] B60R *25/02*

U.S. Cl. 70—208 **4 Claims**

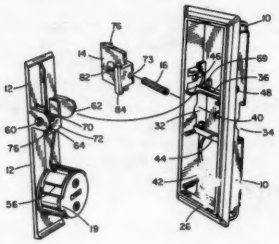
1. A panel lock adapted to be secured in a recess in a panel comprising, in combination:

an elongated panel lock housing, securing means on the panel lock housing for securing the panel lock housing to a panel, said panel lock housing having an elongate re-

cessed cavity with an elongate or longitudinal dimension and a transverse dimension;

a slidable bolt mounted for transverse movement in the cavity, said bolt retained in the cavity by transverse rails which guide the bolt, said housing including at least one opening in a side for receipt of the bolt and for the bolt to project therefrom for engagement with an external strike, biasing means interposed between the bolt and housing for biasing the bolt through the side opening toward engagement with a strike;

a flush mounted push plate over the top of the cavity in the housing, said push plate pivotally attached to the transverse sides of the housing and pivotal about an axis parallel to the direction of bolt movement, said plate including a depending cam surface extending into the cavity, said bolt including a follower member engaged by the cam



surface and imparting a biasing force from the biasing means against the cam surface to thereby bias the push plate flush with the housing, said push plate being manually pivotal against the biasing force to engage the cam surface against the follower and translate the bolt against the force of the biasing means to a position within the housing and out of engagement with a strike;

said push plate further including first and second generally parallel depending legs projecting into the cavity, said legs each including a pivot member on the pivot axis of the plate cooperative with a transverse side wall of the cavity to thereby define the pivot axis for the push plate, said axis adjacent one side of the bolt; and

at least one of said legs including a tab extension segment at the distal end of the leg, said tab extension segment cooperatively engaging with a groove inside the cavity to limit transverse movement of said leg.

4,882,920

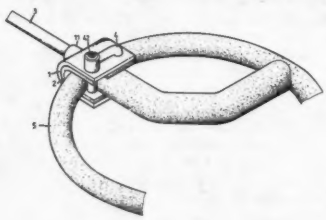
STEERING LOCK FOR AUTOMOBILE

Jinn-Fu Wu, No. 127, Hai Huan Street, Tainan, Taiwan

Filed Apr. 21, 1989, Ser. No. 341,157

Int. Cl.[4] B60R *25/02*

U.S. Cl. 70—209 **1 Claim**



1. A steering lock for an automobile comprising:

a U-shaped hook having an outer tubular member at one end, two holes at one side and two aligned holes at the other side;

a latch rod having a stop shoulder at one side and a handgrip at another end, said stop shoulder being placed between said sides and adjacent said outer tubular member of said U-shaped hook;

an engaging member having two actuating members, a lock core, a lock bolt and a slot; wherein, said engaging members being designed to clamp a rib of a steering wheel while said stop shoulder of said latch rod is abutted against a steering wheel.

4,882,921

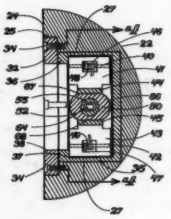
KING PIN LOCK

Frank Wopinski, 24320 Ave. 95, Terra Bella, Calif. 93270

Filed Dec. 1, 1988, Ser. No. 278,481

Int. Cl.[4] F16B *41/00*

U.S. Cl. 70—232 **4 Claims**



1. A king pin lock for securement to a cylindrical king pin of a trailer having an exterior circumferential undercut groove, said lock comprising:

a generally hemispherical body member having a blind stepped diameter central bore;

an outer larger diameter portion of said central bore opening to a flat planar face of said hemispherical body member;

a hollow cylindrical locking shell received in an inner reduced diameter portion of said central bore;

said locking shell having an interior undercut groove;

a circular retaining plate secured in said outer larger diameter portion of said central bore and partially overlying an outer end face of said locking shell;

aligned circular bores dimensioned to receive a trailer king pin formed through said retaining plate and said outer end face of said locking shells;

aligned transverse apertures formed through a side wall of said hemispherical body member and said locking shell;

a key operated lock cylinder secured in said transverse aperture of said hemispherical shell;

an inner end of a rotary actuating shaft of said lock cylinder extending through said transverse aperture of said locking shell;

a cam, in said locking shell, having arcuate opposite end portions connected by straight side walls and secured for rotation with said actuating shaft;

a pair of arcuate locking arms disposed in said undercut groove in said locking shell, on opposite sides of said cam;

each of said locking arms having a first end portion abutting said cam, and a second end portion remote from said cam;

a pivot pin, extending parallel to a central longitudinal access of said cylindrical locking shell, adjacent the first end portion of each of said locking arms and mounting said locking arms for limited pivotal radial movement; and

a torsional coil spring received around each of said pivot pins, biasing said locking arms to radially outer positions, whereby a trailer king pin may be inserted into said locking shell and said locking arms may be moved radially inwardly into engagement with the exterior undercut

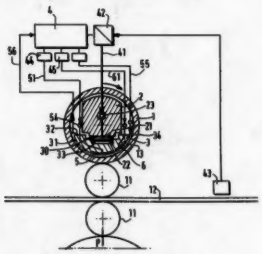
groove of the king pin by rotating said cam by rotation of said actuating shaft of said key lock cylinder.

4,882,922

ROLLING MILL ROLL WITH ROTATING SHELL

Boulot Dominique, Boulogne, France, assignor to Clecim S. A., Courbevoie Cedex, France

Filed Jun. 1, 1987, Ser. No. 55,961
Claims priority, application France, Jun. 4, 1986, 86 08074
Int. Cl.[4] B21B *29/00, 37/00*
U.S. Cl. 72—243 **11 Claims**



1. A rolling mill for rolling metal products with rolls mounted in a roll stand structure to transmit a rolling load, comprising at least roll with a deformable rotating shell, said roll comprising a fixed support **(2)** in the form of an elongated beam, a tubular shell **(1)** surrounding the support beam **(2)** and rotatably mounted about an axis, a plurality of means **(3)** for holding the shell, these means being distributed side by side along the length of the beam and in a screw-down plane (P) along which the rolling load is transmitted, each holding means comprising a shoe **(3)**, essentially centered in the bearing plane (P), disposed between the shell **(1)** and the support beam **(2)** and slidably mounted on said support beam in a radial direction, essentially in the screw-down plane (P), and a means **(30)** for regulating the radial thrust of the shoe **(3)**, which thrust bears on the shoe and on the beam, the shoe **(3)** being provided with a cylindrical bearing face **(31)** having a radius essentially equal to that of the internal face **(13)** of the shell **(1)** and connected to means **(51, 55)** for introducing continuously, in the direction of rotation of the shell, a lubricating fluid in the form of a film disposed in the gap **(52)** between the bearing face **(31)** of the shoe and the internal face **(13)** of the shell, wherein each shoe **(3)** is provided, on the part **(36)** of its bearing face **(31)** which is turned upstream with respect to the direction of rotation of the shell **(1)**, with an auxiliary means **(6)** of lateral thrust against the internal face **(13)** of the shell in a radial direction (D) inclined upstream with respect to the screw-down plane (P) and under sufficient pressure to cause, during service, a slight angular shift in the shoe which is capable of bringing about, by a wedge effect, the relative centering of the shell **(1)** with respect to the shoe **(3)**.

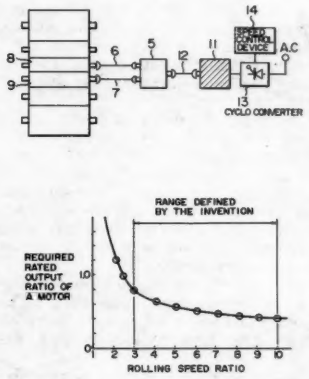
4,882,923

CONTINUOUS MILL PLANT FOR ROLLING STEEL PLATES

Kozaburo Ichida; Susumu Yamaguchi, and Bunichiro Chikazawa, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation of Ser. No. 214,872, Jul. 5, 1988, abandoned, which is a continuation of Ser. No. 831,953, Feb. 24, 1986, abandoned. This application Mar. 3, 1989, Ser. No. 319,828
Claims priority, application Japan, Feb. 25, 1985, 60-34533
Int. Cl.[4] B21B *35/04*
U.S. Cl. 72—249 **7 Claims**

1. A continuous mill plant for producing steel plates having a ratio of maximum rolling speed to minimum rolling speed variable from at least 3.0 to no more than 10.0 at a continuous rated output of at least one alternating current electric motor for driving at least one rolling mill, and means for controlling



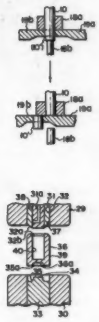
the speed of said motor in accordance with said ratio such that the one rolling mill is adaptable to roll materials of different thicknesses.

4,882,924

METHOD AND APPARATUS FOR MANUFACTURING HOLLOW CYLINDRICAL GUIDE ROLLER FOR MAGNETIC RECORDING TAPE

Takayuki Kohama, and Hideo Kojima, both of Yokohama, Japan, assignors to Sanshin Industry Co., Ltd., Yokohama, Japan

Filed Sep. 22, 1987, Ser. No. 99,794
Int. Cl.[4] B21C *23/14;* **B21D** *28/28, 45/06;* **B21K** *21/12*
U.S. Cl. 72—254 **6 Claims**



1. A method of manufacturing a hollow type guide made of non-magnetic ductile material for guiding magnetic recording tape, comprising the steps of:

shearing a blank of predetermined length, having a first end and a second end, from a round rod-like metal wire;

inserting the blank into a first bore in a first die containing a first punch;

moving a second die facing the first die and having a second punch aligned with the bore in the first die towards the first die to urge the second end of the blank against the

first punch and forming a shallow cylindrical recess at said second end of the blank with the first punch;

inserting the blank having a shallow cylindrical recess into the bore of a third die containing an axially movable third punch such that the recess faces a fourth die which faces the third die, said fourth die having an annular cavity aligned with the bore of the third die and in which an axially movable annular die is arranged, a stationary punch being arranged at the center of the annular cavity and having a first vent slot extending axially along the stationary punch and communicating with said annular cavity;

moving the third die relative to the fourth die opposing the third die;

forming the blank into a cup-shaped blank closed at the first end and having a predetermined length and wall thickness by moving the third punch a predetermined distance relative to the fourth die to apply pressure on a first end of the blank to extrude it into the annular cavity in the fourth die while applying a lower pressure on the opposite end of the blank with the annular die;

supplying air into the cup-shaped blank via said vent slot from the atmosphere thereby preventing the blank from being deformed by negative pressure, and removing the cup-shaped blank from the annular cavity in the fourth die;

inserting said cup-shaped blank in a large diameter bore of a fixed fifth die with the closed end facing inwards, said fifth die having a small diameter bore communicating with the large diameter bore;

moving a sixth die arranged so as to face the fifth die, with respect to the fifth die, said sixth die having an axially movable punch and a vent slot formed in the movable punch;

punching out the closed end of the cup-shaped blank with the axially movable punch of the sixth die to form the hollow tape guide while exhausting the internal air of the cup-shaped blank to the atmosphere via the vent slot of said axially movable punch preventing deformation of the blank due to the air compression between the closed portion of the cup-shaped blank and the movable punch of the sixth die.

4,882,925

METHOD OF MAKING TERMINAL NUT FOR IGNITION PLUG BY PLASTIC WORKING

Tsugumi Ichie, and Minoru Ando, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Dec. 8, 1988, Ser. No. 282,263

Claims priority, application Japan, Apr. 14, 1988, 63-92495

Int. Cl.[4] B21K *21/10*

U.S. Cl. 72—356 **9 Claims**

1. A method of making terminal nut for ignition plug by plastic working, comprising;

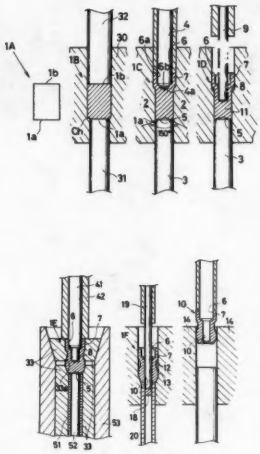
first step in which a column-shaped metallic blank is set into a cylindrical die, and struck at both end surfaces by plungers to flatten the end surfaces in perpendicular to axial direction of said blank;

second step in which a punch rod is forcibly caved into one end surface of said blank with other end surface supported by a conical headed mandrel in order to form a central conical dent at one end surface of said blank, and at the same time, forming first bottom-ended hole at other end surface of said blank by means of reducing;

third step in which a punch rod is forcibly caved into said first bottom-ended hole to form second bottom-ended hole at said blank concentrically and continuously from said first bottom-ended hole to be diametrically lesser than said first bottom-ended hole;

fourth step in which said blank is enclosed into a cylindrical die having a constricted inner wall, and axially contracted to bulge a side surface of said blank diametrically outward by means of upsetting;

fifth step in which a perforation hole is axially formed at said blank by a punching means in concentrical relationship with said first bottom-ended hole, said perforation hole being diametrically corresponding to said second bottom-ended hole;



sixth step in which said blank is shaved at its bulged portion with the use of a cylindrical die means.

4,882,926

ROLL FORMING NOTCHES IN A THIN-WALL POWER TRANSMISSION MEMBER

Carl Anderson, Mt. Clemens, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.

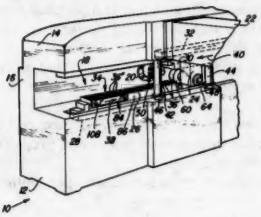
Division of Ser. No. 88,696, Aug. 21, 1987, Pat. No. 4,819,468. This application Oct. 27, 1988, Ser. No. 263,396

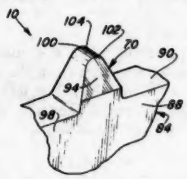
Int. Cl.[4] B21D *28/30;* B21H *5/00*

U.S. Cl. 72—469 **6 Claims**

1. A notch forming die member (84) for cooperating with a spline forming die member (26,30) to form a splined transmission member (52) including at least some notched splines (68') from a thin-walled blank, said notch forming die member (84) comprising: an elongated body portion (84) for being mounted adjacent a body portion of a spline forming die member (26,30), notch forming means (70) extending from said body portion (84), and alignment means for aligning said body por-

tion (88) with the body portion (86) of a spline forming die member (26,30) and aligning said notch forming means (70)





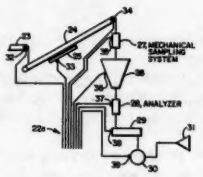
with the troughs between the teeth (36) of the spline forming die member (26,30).

4,882,927

METHOD AND APPARATUS FOR AUDITING MEANS USED FOR MEASURING CHARACTERISTICS OF A BULK MATERIAL

Gregory Gould, 30 Clairmont Ave., Thornwood, N.Y. 10594

Filed Jan. 19, 1988, Ser. No. 144,995
Int. Cl.[4] G01D *18/00, 21/02;* G01G *23/01*
U.S. Cl. 73—1 R 112 Claims



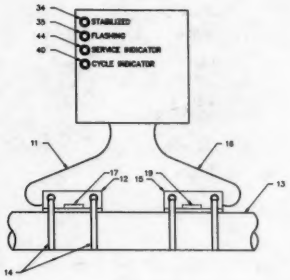
1. A method of auditing for accuracy or reliability of measurement a means used for measuring one or more characteristics of a bulk material which comprises the steps of measuring said one or more characteristics of said bulk material with said means, and concurrently measuring one or more variables, which variables are independent of said means for measuring said characteristics and which variables directly or indirectly affect the normal operation of said means and thereby affect the accuracy or the reliability of the results obtained by the means used to measure one or more characteristics of said bulk material.

4,882,928

REFRIGERATION EFFICIENCY MONITORING SYSTEM

William E. Lane, Jr., 2539 NE. 32nd Pl., Ocala, Fla. 32570; Clayton E. Leist, II, 4010 SE. 23rd Ave., Ocala, Fla. 32671, and Bradley L. Busch, 810 SW. 23rd Pl., Ocala, Fla. 32674

Continuation-in-part of Ser. No. 136,550, Dec. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 919,787, Oct. 16, 1986, abandoned. This application Oct. 11, 1988, Ser. No. 255,880
Int. Cl.[4] G01N *29/02*
U.S. Cl. 73—19 20 Claims



1. A device useful for monitoring the thermodynamic state of a fluid flowing through a conduit, which comprises:

(a) a first electromechanical transducer,

(b) means to acoustically couple said first transducer to a conduit,

(c) a precision oscillator which provides a driving electrical signal characterized by an ultrasonic frequency to said first transducer,

(d) a second electromechanical transducer,

(e) means to acoustically couple said second transducer to said conduit in a spaced relationship to said first transducer,

(f) a receive amplifier tuned to the output frequency of said oscillator operating to receive and amplify the ultrasonic signal received from said second transducer,

(g) a tracking receiver-decoder operating to convert the ultrasonic signal received from said receive amplifier into a digital logic signal,

(h) an integrator circuit operating to average said digital logic signal from said tracking receiver-decoder, and

(i) a comparator connected to the output of said integrator operating to compare the averaged DC output from said integrator with a preset reference voltage and to provide first and second signals indicative of said comparison.

4,882,929

APPARATUS AND PROCESS FOR MEASURING CHANGES IN EFFECT OF TIDAL FORCES

Robert L. Brown, Buena Park, Calif., assignor to Total Environmental Services Technology, Inc., Huntingdon Beach, Calif.

Filed Jan. 29, 1988, Ser. No. 150,085
Int. Cl.[4] G01M *3/26*
U.S. Cl. 73—49.2 28 Claims

1. In combination: a measuring device used in conjunction with leak detector system means which measures leakage of liquid into or out of liquid storage tanks, for providing a correction in said leak detector system means to account for liquid level changes caused by tidal forces, the combination comprising:

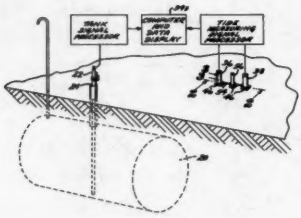
leak detector system means for monitoring the liquid level in a liquid storage tank;

a first container for a measuring liquid, and a second container for the measuring liquid, the first and second con-

tainers being positioned at a predetermined distance from one another, each of the first and second containers being isolated from fluid-communication with the liquid storage tank;

a duct in fluid communication with the first container and with the second container, thereby placing the first and second containers in fluid communication with one another;

first means for monitoring the level of the measuring liquid in the first container, the first means providing a first



output signal indicative of the level of the measuring liquid in the first container; and

second means for monitoring the level of the measuring liquid in the second container, the second means providing a second output signal indicative of the level of the measuring liquid in the second container, the difference between the first and second output signals being indicative of the difference in the heights of the measuring liquid columns in the first and second containers, and is thereby indicative of the tidal forces effects on the measuring liquid in the containers.

4,882,930

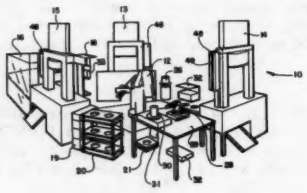
MELT INDEXER SYSTEM WITH ROBOT OPERATION

Gabor S. Nagy, Waxhaw, N.C.; Richard C. Akeson, Cedarberg, Wis.; Richard E. Sweenie, Watertown, Wis.; Mark E. Novak; Harry K. Malsch, both of Milwaukee, Wis.; Thomas J. Widule, Elm Grove, Wis.; Gustav L. P. Ding, Milwaukee, Wis., and Jared K. Jackson, Brookfield, Wis., assignors to Automatik Machinery Corporation, Charlotte, N.C.

Filed Jun. 17, 1988, Ser. No. 208,742

Int. Cl.[4] G01N *11/04*

U.S. Cl. 73—56 **28 Claims**



1. In a melt indexer for determining the melt index of a plastic by testing, said melt indexer having a melt chamber in which a sample of plastic to be tested is placed, heating means for melting the sample to a predetermined temperature and a test piston for extruding the melted sample through a calibrated orifice of a removable die to determine the viscosity of the sample as a function of its temperature, the combination therewith of an automated test system which comprises:

(a) a robot and a computer programmable to control the movement of the robot;

(b) an infeed queue for holding a plurality of containers containing samples to be tested;

(c) identification means for identifying each sample to the tested;

(d) a test computer for associating a particular sample with a predetermined plan for testing the sample, recording and processing the melt index test results;

(e) extracting means for extracting a charge of the sample from the sample container and placing it in the melt chamber;

(f) cleaning means for cleaning the test piston and melt chamber after the test is complete and preparing the apparatus for the next test;

(g) means for detecting and processing exceptions to proper operation of the apparatus;

(g) said robot being operable to:

(i) select a container from the infeed queue;

(ii) hold the container while the sample container is identified;

(iii) open the container;

(iv) hold the container while operating said extracting means to extract a charge from the sample container and place it in the melt chamber; and

(v) manipulate said cleaning means.

4,882,931

METHOD AND AN APPARATUS FOR DETERMINING THE VELOCITY, DIRECTION AND OTHER MAGNITUDES OF A FLOW, IN PARTICULAR A GAS FLOW

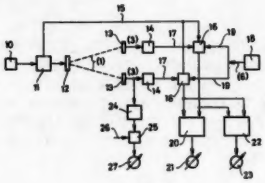
René Breeuwer, Delft, Netherlands, assignor to Ahrin BV, Netherlands

Continuation of Ser. No. 142,634, Jan. 11, 1988, abandoned, which is a continuation of Ser. No. 912,075, Sep. 25, 1986, abandoned. This application Oct. 5, 1988, Ser. No. 253,495

Claims priority, application Netherlands, Sep. 30, 1985, 8502673

Int. Cl.[4] G01W *1/04*; G01F *1/66*

U.S. Cl. 73—189 **12 Claims**



1. Apparatus for determining the velocity and direction of a gas flow comprising:

first transducer means for emitting a strongly damped acoustic signal characterized by a waveform having one peak of amplitude substantially greater than all other peaks in said waveform;

second transducer means for receiving said acoustic signal;

threshold circuit means associated with said second transducer for setting a threshold level and deriving an output signal in response to reception of a peak exceeding said level;

energizing circuit means for driving said first transducer; and

timer means connected to said energizing circuit means and an output of said threshold circuit means for measuring the time lapse between said emission and said reception;

said threshold level being adjustable to a level lower than said one peak but higher than said all other peaks, whereby said output signal is normally triggered if at all only by said one peak to avoid erroneous time measurements.

4,882,932

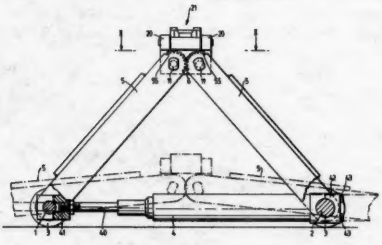
LIFT WITH TRANSDUCER FOR BALANCING TIRES ON A VEHICLE

Remo Corghi, 1, Piazza Carducci - I 42015, Correggio Emilia (Reggio Emilia), Italy

Continuation of Ser. No. 196,769, May 18, 1988, abandoned, which is a continuation of Ser. No. 860,875, May 8, 1986, abandoned. This application Nov. 22, 1988, Ser. No. 274,684

Int. Cl.[4] G01M *1/28;* B66F *5/00*

U.S. Cl. 73—457 13 Claims



1. Wheel balancing apparatus comprising, a lifting unit and a piezoelectric transducer, said lifting unit comprising a trolley having a first arm and a second arm, each arm having an upper end and a lower end, means pivotally connecting said lower ends of said arms to supports spaced from each other for movement of said lower ends toward and away from each other, means pivotally connecting said upper ends of said arms to a horizontal housing containing said piezoelectric transducer, said arms converging toward each other from said lower ends toward said housing, means interconnecting said arms for simultaneous movement of said lower ends of said arms toward and away from each other, a lifting and support saddle above said housing, said support saddle extending transversely of said arms, means for driving said lower ends of said arms toward each other to lift said housing, and means supporting said saddle on said transducer so that vibrations from a wheel supported by said saddle are transmitted to said transducer.

4,882,933

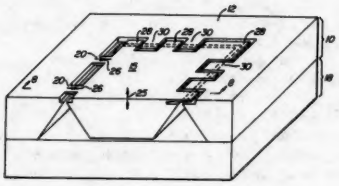
ACCELEROMETER WITH INTEGRAL BIDIRECTIONAL SHOCK PROTECTION AND CONTROLLABLE VISCOUS DAMPING

Kurt E. Petersen, San Jose, and Phillip W. Barth, Palo Alto, both of Calif., assignors to NovaSensor, Fremont, Calif.

Filed Jun. 3, 1988, Ser. No. 202,081

Int. Cl.[4] G01P *15/08*

U.S. Cl. 73—517 R 34 Claims



1. A sensing device comprising:

a supporting frame having an opening therein;

a mass disposed in the opening and movable along at least one axis;

a flexure coupled between the frame and the mass;

stop means integral to the supporting frame and the mass and mounted along the respective adjacent edges of the frame and the mass for restricting movement of the mass structure in at least one direction along the at least one axis; and

sensing means coupled to at least the flexure for detecting movement of the mass structure.

4,882,934

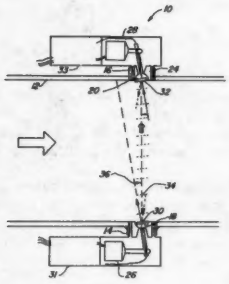
ULTRASONIC INSTRUMENT TO MEASURE THE GAS VELOCITY AND/OR THE SOLIDS LOADING IN A FLOWING GAS STREAM

Charles B. Leffert, 1302 Wrenwood Dr., Troy, Mich. 48084, and Leo H. Weisman, Warren, Mich., assignors to Charles B. Leffert, Troy, Mich.

Continuation-in-part of Ser. No. 839,033, Mar. 12, 1986, Pat. No. 4,726,235. This application Feb. 18, 1988, Ser. No. 157,413

Int. Cl.[4] G01F *1/74*

U.S. Cl. 73—861.04 27 Claims



1. An instrument for measuring the velocity of a fluid being transported through a conduit comprising:

a first ultrasound transducer defining an aiming line,

first coupling means for mounting said first transducer to said conduit and for enabling the angle of said first transducer aiming line to be varied,

a second ultrasound transducer defining an aiming line;

second coupling means for mounting said second transducer to said conduit and for enabling the angle of said second transducer aiming line to be varied,

actuation means for controlling said aiming line angles of said first and second transducers such that said first transducer aiming line can be displaced upstream with respect to said fluid flow, and said second transducer aiming line is simultaneously displaced downstream with respect to said fluid flow, and

controlling and processing means for causing said first transducer to generate a packet of ultrasound energy which traverses said fluid flow and which is detected by said second transducer whereby the angular displacement of said first transducer aiming line is related to the downstream drift of said packet of ultrasound energy caused by said fluid velocity and said controller and processing means further for determining said velocity.

4,882,935

CONVECTIVE ATTENUATION FLOWMETER

Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005

Continuation-in-part of Ser. No. 71,777, Jul. 10, 1987, and a continuation-in-part of Ser. No. 163,855, Mar. 3, 1988. This application Jul. 5, 1988, Ser. No. 215,033

Int. Cl.[4] G01F *1/84*

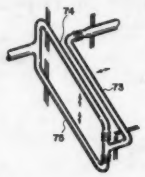
U.S. Cl. 73—861.38 18 Claims

1. An apparatus for measuring mass flow rate comprising in combination:

(a) a pair of conduits, each conduit connected to a first port leg at first extremities of the pair of conduits and to a third conduit at second extremities of the pair of conduits oppo-

site to said first extremities, said third conduit connected to a second port leg, wherein at least one of the pair of conduits has one extremity disposed in an arrangement restraining lateral deflection thereof and the other extremity disposed in a laterally deflective arrangement, and the third conduit has one extremity disposed in an arrangement restraining lateral deflection thereof and the other extremity disposed in a laterally deflective arrangement;

(b) means for imposing flexural vibrations on said at least one of the pair of conduits and the third conduit;



(c) first means for determining time rate of loss of momentum with the flexural vibration of said at least one of the pair of conduits; and

(d) second means for determining time rate of loss of momentum associated with the flexural vibration of the third conduit;

wherein mass flow rate of media moving through the apparatus is determined from the difference in the time rates of loss of momentums respectively determined by said first and second means for determining time rate of loss of momentum.

4,882,936

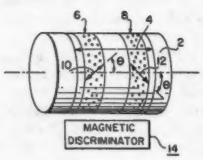
MAGNETOELASTIC TORQUE TOOL

Ivan J. Garshelis, Cheshire, Mass., assignor to Mag Dev Inc., Pittsfield, Mass.

Continuation-in-part of Ser. No. 938,404, Dec. 5, 1986, Pat. No. 4,760,745. This application Sep. 14, 1987, Ser. No. 95,774

Int. Cl.[4] G01L *3/10*

U.S. Cl. 73—862.36 **30 Claims**



1. A hand tool for applying torque to a fastener including fastener-engaging means, handle means to which torque is hand-applied and torque carrying means operatively coupled with said handle means and said fastener-engaging means for transmitting the hand-applied torque to the fastener, said torque carrying means including a magnetoelastic torque transducer, said torque carrying means comprising a member having a ferromagnetic and magnetostrictive region formed of nickel maraging steel, said transducer comprising:

a pair of axially spaced-apart annular bands defined within said region, said bands having respectively symmetrical right and left hand helically directed residual stress created magnetic anisotropy, each said band having at least one circumferential region which is free of residually unstressed areas over at least 50% of its circumferential length;

means for applying a cyclically time varying magnetic field to said bands;

means for sensing the change in permeability of said bands caused by said applied torque;

means for converting said sensed change in permeability to an electrical signal indicative of the magnitude of the torque applied to said member; and

indicator means responsive to said electrical signal for providing an indication that a predetermined torque has been applied to said fastener.

4,882,937

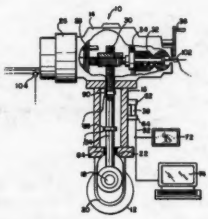
STRAIN SENSOR FOR ATTACHMENT TO A STRUCTURAL MEMBER

Robert L. Leon, Roslyn, Pa., assignor to Liberty Technology Center, Inc., Conshohocken, Pa.

Continuation of Ser. No. 87,541, Aug. 20, 1987, Pat. No. 4,805,451. This application Nov. 14, 1988, Ser. No. 270,138

Int. Cl.[4] G01L *1/22*

U.S. Cl. 73—862.67 **6 Claims**



1. A strain sensor device for attachment to a structural member for measuring compressive and tensile strains experienced by the member along a strain axis of the structural member, the strain sensor device comprising:

a strain member adhesively secured to the structural member generally parallel to but not in series with the structural member strain axis so that the strain sensor experiences only a portion of the load experienced by the structural member, the strain member being secured to the structural member under a predetermined tension to facilitate generally continuous sensing of both compressive and tensile strains experienced by the structural member; and

four strain gages secured to the strain, member, two of the strain gages being longitudinally oriented with respect to the strain member to experience longitudinal strain and two of the strain gages being transversely oriented with respect to the strain member to experience Poisson strain, the four strain gages forming a strain gage bridge circuit for generating electrical signals proportional to strains sensed in the structural member.

4,882,938

PICK-UP UNIT FOR WITHDRAWING CIGARETTE SAMPLES FROM A MASS OF CIGARETTES

Armando Neri, Naples, Italy, assignor to G.D Societa' Per Azioni, Bologna, Italy

Filed Apr. 6, 1988, Ser. No. 178,200

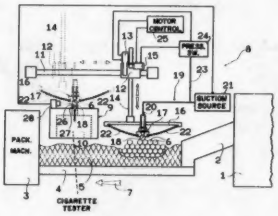
Claims priority, application Italy, Apr. 15, 1987, 3433 A/87

Int. Cl.[4] G01N *1/08*

U.S. Cl. 73—863.91 **4 Claims**

1. A pick-up unit for withdrawing sample cigarettes from a mass of cigarettes traveling perpendicularly in relation to the cigarette axes, each said cigarette occupying random positions within the said mass as the latter travels in the said direction; the pick-up unit comprising a mobile head (17) for withdrawing at least one cigarette (6) at a time from said mass (5), the mobile head (17), in turn, comprising at least one suction seat (18) for picking up a respective said cigarette (6); a pneumatic suction circuit (19) connected to said seat (18); reversible actuating means (13, 15 or 33, 35) connected to the mobile head (17), for moving the mobile head along a given route between

a given release position and a pick-up position, which is located at a random point along the route of the mobile head (17); and sensor means (24) connected to the pneumatic suction circuit



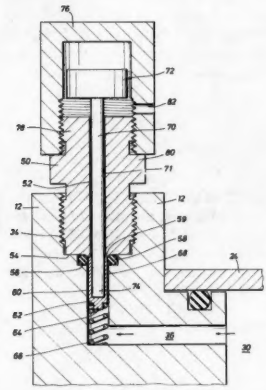
(19), for reversing the actuating means (13, 15 or 33, 35) in response to a sharp fall in pressure inside the pneumatic circuit (19).

4,882,939

PURGE VALVE

Brian H. Welker, Sugar Land, Tex., assignor to Welker Engineering Company, Sugar Land, Tex.

Filed Sep. 12, 1988, Ser. No. 243,261
Int. Cl.[4] G01N *1/10*
U.S. Cl. 73—864.03 **24 Claims**



1. A purge valve assembly for use with an elongate constant pressure sample cylinder having a first end cap at one end of the cylinder and a second end cap at the opposite end and a slidable piston positioned inside the cylinder defining a first chamber and a second chamber, the assembly comprising:

(a) said first end cap of said cylinder forming a port and a passageway to allow fluid communication from said first chamber through said passageway, through said port, through said purge valve assembly and to atmosphere when said purge valve assembly is opened;

(b) a retainer removably engaging said port in said first end cap, said retainer having a central longitudinal bore in open communication with said port and the atmosphere;

(c) a valve element;

(d) a valve stem passing through said longitudinal bore of said retainer and removably engaging said valve element;

(e) a sealing element held in said port by said retainer, said sealing element establishing sealing engagement with said end cap and said retainer to prevent the escape of said fluid from said port past said retainer to the atmosphere, said sealing element establishing sealing engagement with said valve element to prevent fluid from passing from said port to said bore to said atmosphere when said purge valve assembly is closed; and

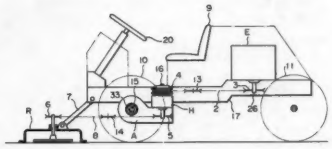
(f) a spring in said port urging said valve element into an engagement with said sealing element to prevent fluid from escaping from said first chamber when said purge valve assembly is closed.

4,882,940

POWER TRANSMISSION MECHANISM FOR TRACTOR

Kojiro Yamaoka, Nishinomiya; Toshiro Azuma, Minoo; Koichiro Fujisaki, Kobe, and Hideaki Okada, Takarazuka, all of Japan, assignors to Kanzaki Kokyukoki Mfg. Co. Ltd., Japan

Continuation of Ser. No. 872,478, Jun. 10, 1986, abandoned.
This application Feb. 3, 1989, Ser. No. 306,223
Claims priority, application Japan, Jun. 12, 1985, 60-12881; Jul. 30, 1985, 60-177646[U]; Aug. 20, 1985, 60-127488[U]
Int. Cl.[4] F16H *37/00*
U.S. Cl. 74—15.166 **6 Claims**



1. A power transmission mechanism, comprising:

a hydrostatic transmission including an input shaft for driving said hydrostatic transmission, and an output shaft;

said input shaft having an upper driven portion and a lower portion which project through said hydrostatic transmission;

a transmission mechanism for transferring power from said output shaft;

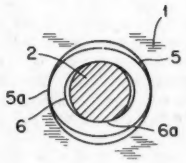
a power take-off unit for driving a mechanical attachment about a substantially vertical axis, said power take-off unit being disposed on said lower portion of said input shaft, wherein said power take-off unit is directly driven by said input shaft.

4,882,941

RETAINER FOR ONE-WAY CLUTCH

Yoshio Kinoshita, Kanagawa, Japan, assignor to NSK-Warner K.K., Tokyo, Japan

Filed May 19, 1987, Ser. No. 51,320
Claims priority, application Japan, May 23, 1986, 61-76934
Int. Cl.[4] F16D *15/00, 23/00, 41/06, 43/00*
U.S. Cl. 192—45.1 **19 Claims**



1. An annular retainer in a one-way clutch, said clutch comprising first and second rotary members arranged spacedly in a radial direction, rotatably relative to each other and concentrically with each other and having axially-extending annular surfaces respectively and torque-transmitting members arranged between the first and second rotary members to trans-

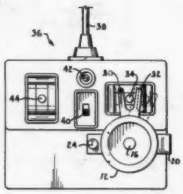
mit torques between the annular surfaces, said annular retainer being located between the first and second rotary members and adapted to hold the torque transmitting members at equal angular intervals, said annular retainer comprising a first retainer member provided adjacent the first rotary member and a second retainer member disposed adjacent the second rotary member, each of said retainer members circumscribing one of said rotary members wherein the retainer has such a specific shape so as to maintain at least a part of one of said retainer members in contact with the annular surface of the first or second rotary member, wherein said one retainer member is flexed in its entirety due to said contact and wherein the first retainer member has, at one axial end thereof, a flange bent at a right angle toward the first rotary member and the first retainer member is in contact with the first rotary member at an end portion of the flange, and wherein said first retainer member has the specific shape formed at the end of said flange.

4,882,942

STEERING WHEEL ATTACHMENT FOR RADIO CONTROL DEVICES

Hudson Hamilton, 2924 Eveningside, Topeka, Kans. 66614

Filed Jun. 13, 1988, Ser. No. 206,047
Int. Cl.[4] G05G *1/00*; F16H *21/44*; A63H *17/39*
U.S. Cl. 74—104 **4 Claims**



1. An actuating mechanism for attachment to radio control transmitters having a housing and a linearly moveable control stick protruding therefrom, comprising:

a steering wheel apparatus actuatable by rotary motion;

a fork-shaped operating member having two arms extending from said steering wheel apparatus for rotation therewith, and adapted to receive said control stick between said arms;

means for detachably mounting said apparatus to the remote control transmitter in an operative position;

whereby when said mechanism is in said operative position on the transmitter, said operating member receives the control stick between said arms and translates the rotary motion of said steering wheel apparatus into rectilinear motion to actuate the control stick; and

said arms of said operating member diverging as they project from said steering wheel apparatus.

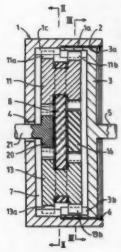
4,882,943

BACKLASH-FREE REDUCING MECHANISM, PARTICULARLY USABLE FOR SETTING VARIOUS PARTS OF A SEAT OF AN AUTOMOBILE VEHICLE

Yves Pipon, Saint Georges des Groseillers, and Bernard Chales, Aubusson, both of France, assignors to A&M Cousin, Orne, France

Filed Dec. 2, 1988, Ser. No. 278,822
Claims priority, application France, Dec. 3, 1987, 87 16777
Int. Cl.[4] F16H *55/18*
U.S. Cl. 74—409 **7 Claims**

1. A backlash-free reducing mechanism, particularly usable for setting various parts of a seat of an automobile vehicle, including a fixed flange (1) rigidly connectable to a sitting portion frame of the seat and being insidely provided with a toothed ring (1*c*) with which meshes a first toothing of a double planet wheel (10, 11, 12, 13) having a first and a second toothing, then a mobile flange (3) rigidly connectable with a backing portion frame of the seat and having an inner toothed ring (3*b*) intended for cooperating with a second toothing of the double planet wheels (10, 11, 12, 13), this mobile flange (3) being maintained free in rotation in the fixed flange (1) by a circular member (6, 27), and wherein the double planet wheels (10, 11, 12, 13) are maintained by a median cylindrical portion thereof in the reducing mechanism by a central planet wheel



holding piece (8) having resilient means and are centered on a side of the toothed ring of one of the flanges (1, 3) by a resilient floating idle pinion (16), a pinion (20) driven by a control shaft (21) being additionally provided for driving the double planet wheels (10, 11, 12, 13), such a mounting permitting a radial displacement of the double planet wheels by application against the toothed rings of the flanges (1, 3), while maintaining the median cylindrical portions of the double planet wheel (10, 11, 12, 13) in respective angular positions.

4,882,944

TORSIONAL VIBRATION DAMPER

Hans-Jürgen Vohl, Maxsain, Fed. Rep. of Germany, assignor to Metzeler GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,139
Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722352; May 13, 1988, 3816324
Int. Cl.[4] F16F *15/10*
U.S. Cl. 74—574 **19 Claims**

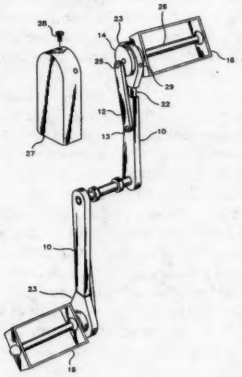
1. Torsional vibration damper, comprising a hub to be mounted on a crankshaft, a flywheel ring having an outer surface, said hub and said flywheel ring each being a shaped flat, annular, disk-shaped sheet metal blank, a substantially radially extending rubber layer connecting said hub to said flywheel ring, and a V-belt carrier molded from sheet metal as well as a transducer wheel both being secured at least on said outer surface of said flywheel ring.

4,882,945

PEDAL EXTENSION DEVICE

Jose Trevizo, 434 Auburn Ave., San Marcos, Calif. 92069

Filed Apr. 17, 1989, Ser. No. 339,522
Int. Cl.[4] G05G *1/14*
U.S. Cl. 74—594.3 2 Claims



1. A crankshaft pedal arm assembly for increasing the length of a bicycle pedal support arm as a function of the rotary position of a drive sprocket wherein the improvement comprises:

(a), the pedal support arms terminating in telescopically attached bearing hub;

(b), a crank-disc with a first radially spaced crank-pin attached to an end of a pedal axel;

(c), a connecting rod engaging said first crank-pin in the crank-disc rotatably connected to a second crank-pin mounted on the pedal support arm;

(d), rotation of the crank-disc drives the connecting-rod which introduces reciprocating movement of the bearing hub sliding on a telescopic rod; and,

(e), a protective covering fastened to the bearing hub extends over the crank shaft-pedal arm assembly.

4,882,946

PEDAL FOR A BICYCLE OR SIMILAR DEVICE

Jean J. Beyl, 10, boulevard Victor Hugo, 58000 Nevers, France

Continuation of Ser. No. 943,933, Dec. 19, 1986, which is a continuation-in-part of Ser. No. 48,533, May 5, 1987, Pat. No. 4,762,019, which is a continuation of Ser. No. 735,210, May 17, 1985, abandoned. This application Oct. 28, 1988, Ser. No. 265,353
Claims priority, application France, May 18, 1984, 8407786; Dec. 14, 1984, 8419173; Dec. 24, 1985, 8519135
Int. Cl.[4] G05G *1/14*
U.S. Cl. 74—594.6 14 Claims

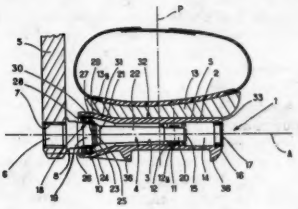
1. A bicycle pedal or the like comprising:

(a) pedal body means defining a housing;

(b) a transverse spindle defining an axis of rotation and having first and second ends with said first end projecting out of the housing and adapted to be fixed to a crank;

(c) first and second rotary bearings provided respectively near the first and second ends of said spindle, for rotatably mounting said pedal body means on said transverse spindle, said second rotary bearing having an external diameter which is smaller than the external diameter of the first rotary bearing, said housing including a barrel having an external radial dimension and surrounding said first bearing, said second rotary bearing being a needle bearing having an external diameter which is smaller than the external diameter of said first rotary bearing, said housing including a sleeve portion in which said spindle of the pedal extends; and

(d) means defining a bearing surface on the pedal body means for the sole of the user's foot, said bearing surface being constituted by a substantially flat surface which is parallel to the geometrical axis of the said spindle and extends as far as the external edge of the pedal body means without any unevenness or projection, said bearing surface extending over said second rotary bearing and being situated at a distance from said geometrical axis which is smaller than the external radial direction of the barrel in



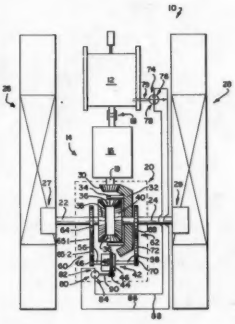
the vicinity of said first rotary bearing, and said bearing surface being situated outwardly of said first rotary bearing, said bearing surface including a rear edge which projects towards the rear with respect to said sleeve portion of the pedal and said rear edge including a hook portion for engaging a block of a user's shoe, said body of the pedal including a pair of side arms each extending rearwardly to define an opening between said arms for receiving the block of the shoe of the user, said side arms having ends carrying support means supporting automatic engaging means for holding the block of a user's shoe when inserted in said opening.

4,882,947

TRACK-LAYING DEVICE

Jan H. Barnard, Sec. 90 of Sec.77, Wildebeesthoek, 310 JR, Pretoria, South Africa

Continuation of Ser. No. 165,389, Feb. 29, 1988, abandoned, which is a continuation of Ser. No. 931,027, Nov. 17, 1986, abandoned. This application Feb. 6, 1989, Ser. No. 307,203
Claims priority, application South Africa, Jan. 29, 1986, 86/0678
Int. Cl.[4] F16H *47/04*
U.S. Cl. 74—687 21 Claims



1. In combination, a transmission and direction control means suitable for use with a vehicle having laterally spaced drive elements and adapted to transmit drive from a drive from

a drive motor of the vehicle to the drive elements of the vehicle, comprising:

a transmission differential gear substantially on a longitudinal vertical line of the vehicle, and having an input which is drivingly connectable to the drive motor, and a pair of half shafts which are respectively drivingly connectable to the drive elements;

a control differential gear substantially on said vertical plane and comprising

a cage,

an input spur gear wheel fast with the cage,

a pair of co-axial, outwardly extending, half shafts providing control half shafts,

a pair of half shaft spur gear wheels respectively fast with said control half shafts at their inner ends, and

at least a first pair of spur pinions mounted for rotation on the cage at circumferentially spaced positions on a pitch circle about the axis of the half shaft spur gear wheels, the pitch circle diameter corresponding to the sum of the effective diameters of the half shaft spur gear wheels and the spur pinions, the circumferential spacing corresponding to the sum of the effective radii of the spur pinions, the arrangement being such that the spur pinions mesh respectively with the half shaft spur gears, and with each other;

first connecting means interconnecting the half shafts of each of the differential gear and the control differential gear for rotation in opposite directions and at a predetermined ratio of speed of the half shaft of the control differential gear to speed of the half shaft of the transmission differential gear larger than 1:1;

second connecting means connecting the other of the half shafts of each of the transmission differential gear and the control differential gear for rotation in the same direction and at a speed ratio similar to said predetermined speed ratio;

a control input drivingly connected to the input spur gear wheel; and

control drive means adapted selectively to hold the control input stationary and to drive the control input in a desired direction and a desired speed.

4,882,948

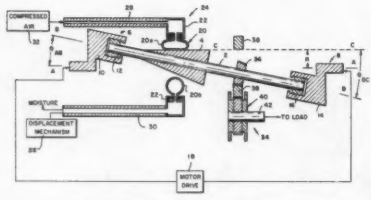
SPEED CONTROL ASSEMBLY FOR NUTATING CONE TRANSMISSION

Raymond A. Byrnes, Jr., 1064 Omar Dr., Crownsville, Md. 21032

Continuation-in-part of Ser. No. 59,406, Jun. 8, 1987, abandoned. This application Nov. 30, 1987, Ser. No. 125,934

Int. Cl.[4] F16H *37/06, 15/20*

U.S. Cl. 74—690 **5 Claims**



1. In a nutating cone drive assembly including a driven input assembly having a first axis, an output assembly, and a nutating cone having an axis arranged at an angle relative to the first axis for transferring drive from the input assembly to the output assembly and the cone has a vertex and a base, the improvement which comprises

(a) flexible speed control ring means formed of synthetic rubber material and having a configuration of a reversely folded tire, said speed control ring means controlling rotational speed of the cone about its axis in response to the nutational drive of the cone imparted by the input assembly;

(b) means having a configuration of an annular wheel rim for mounting said speed control ring means about the cone with an inner surface of said speed control ring means in contact with and depressed by a surface of the cone;

(c) means for supplying pressurized gas to an interior of said speed control ring means, whereby said ring means returns to its normal configuration when out of contact with the cone, and further whereby the traction of said ring means relative to the cone is varied in accordance with the pressure within said ring means;

(d) means connected with said mounting means for removing condensation from the interior of said ring means; and

(e) means for laterally displacing said speed control ring means relative to the cone in a direction parallel with the first axis while preventing rotational movement of said ring means and slippage between said ring means and the cone, whereby when said ring means is displaced toward the vertex of the cone, the speed of rotation of the cone increases along with a ratio of a radius of said ring means to the radius of a conic circle of contact, thus reducing the drive at the output assembly and when said ring means is displaced toward the base of the cone, the speed of rotation of the cone decreases along with the ratio of the radius of said ring means to the radius of the conic circle of contact to increase the drive at the output assembly.

4,882,949

DIFFERENTIAL FOR A MOTOR VEHICLE

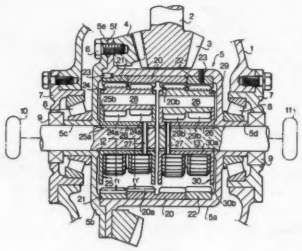
Takeo Inoue, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 13, 1988, Ser. No. 257,990

Claims priority, application Japan, Oct. 15, 1987, 62-260978

Int. Cl.[4] F16H *1/44*

U.S. Cl. 74—714 **8 Claims**



1. A differential for a motor vehicle comprising:

a rotatably supported differential case;

a pair of output shafts rotatably supported and inserted into the differential case;

a pair of carriers provided in the differential case and operatively connected to the output shafts respectively;

a pair of annular side gears securely provided in the differential case;

an annular center gear rotatably mounted in the differential case;

a pair of planetary gears, each comprising a pair of planetary pinions and rotatably supported in a respective one of the carriers,

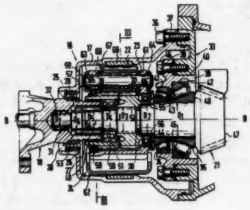
One of the planetary pinions of each planetary gear being engaged with a respective side gear and the other planetary pinions being engaged with the center gear.

4,882,950

DRIVE LINE FOR FOUR WHEEL DRIVE VEHICLES

Klaus Gausrab, Ostfildern; Joachim Hauser, Weissach, and Robert Mueller, Mönsheim, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.V. Porsch AG, Weissach, Fed. Rep. of Germany

Filed Jan. 25, 1988, Ser. No. 148,021
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1987, 3701843
Int. Cl.[4] F16H *1/42, 1/28*
U.S. Cl. 74—714 8 Claims



1. A drive line between two driven axles of a motor vehicle having an all-wheel drive, into which a planetary transmission is connected that has a housing and comprises an input shaft having a first sun gear and a second sun gear at an output shaft, said sun gears engaging with planet gears mounted at a planet carrier, the output shaft being arranged in a bore of the first sun gear by means of a ball bearing;

wherein the input shaft is disposed in an axle journal adjacent one end of the housing by means of a ball bearing, and projects with a shaft section into the housing, the input shaft being provided with a bore extending approximately to the axle journal;

wherein the output shaft is disposed approximately in the area of the axle journal inside the bore, preferably by means of a needle bearing;

wherein the output shaft, at an opposite end of the housing located away from the axle journal, is disposed at a supporting plate of the housing, preferably by means of two tapered roller bearings; and

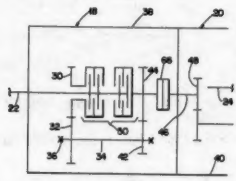
wherein a web is attached to said supporting plate and is provided with two bearing receiving areas for the two tapered roller bearings with the web extending between the two receiving areas for supporting the two tapered roller bearings and wherein the supporting plate is attached to the housing by screws.

4,882,951

AUXILIARY TRANSMISSION INPUT SECTION

Eugene R. Braun, Royal Oak, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 14, 1988, Ser. No. 167,944
Int. Cl.[4] F16H *3/02, 3/08*
U.S. Cl. 74—745 21 Claims



1. An input auxiliary transmission system (18) for a compound vehicular transmission (14) system comprising an auxiliary transmission section connected in series between a vehicular prime mover (12) and a change gear mechanical main transmission section (20), said auxiliary section characterized by:

an input shaft (22) non-disengagably mechanically drivingly connected to said vehicular prime mover, an auxiliary section output shaft (46) and a three position friction clutch (50) having a first position for coupling said auxiliary output shaft to said input shaft at a first speed ratio, or second position for coupling said input shaft to said auxiliary section output shaft at a second speed ratio and a third position allowing independent rotation of said input shaft and auxiliary section output shaft; and

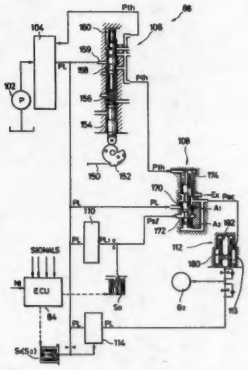
a selectively engagable and disengagable disconnect coupling (66) drivingly interposed between said friction clutch and the main transmission section.

4,882,952

HYDRAULIC CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION WITH SHIFTING SHOCK REDUCING MEANS

Yuji Kashihara, Toyota; Yutaka Taga, Aichi, and Seitoku Kubo, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Feb. 10, 1988, Ser. No. 154,380
Claims priority, application Japan, Feb. 19, 1987, 62-36629
Int. Cl.[4] B60K *41/06*
U.S. Cl. 74—867 14 Claims



1. A hydraulic control system for an automatic transmission, comprising:

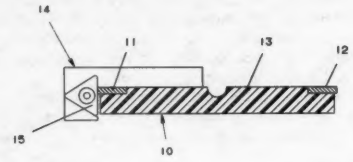
shifting shock reducing means, provided between a shift valve and a frictionally engaging device for changing a gear stage of said automatic transmission, for regulating transitional oil pressure applied to said frictionally engaging device to reduce shifting shock;

torque signal generating means for generating a torque signal representative of engine output torque;

transitional shift state signal generating means for generating a transitional shift state signal representative of a transitional state of shifting operation; and

control means for controlling said shifting shock reducing means on the basis of at least said torque signal and said transitional shift state signal.

4,882,953
SKI SHARPENER
Donald M. Kalka, P.O. Box 94, Lakeview, Mich. 48850
Filed Dec. 22, 1988, Ser. No. 288,765
Int. Cl.[4] B21K *17/00*
U.S. Cl. 76—83 3 Claims

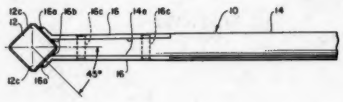


1. An edge-sharpening device, comprising:
a unitary block forming an angular frame providing a guide surface and a wall disposed at an angle to said guide surface, said frame having a recess in an end of said wall adapted to receive a standard cutting insert providing at least one cutting edge, said recess positioning said insert so that said cutting edge intersects the plane of said guide surface.

4,882,954
UNLOCKING DEVICE FOR VEHICLE DOORS
Douglas S. Selby, Rte. 5, Red Hill Dr., Unit R-2, Louisville, Tenn. 37777
Filed Mar. 21, 1988, Ser. No. 171,395
Int. Cl.[4] E06G *19/20*
U.S. Cl. 81—15.9 11 Claims

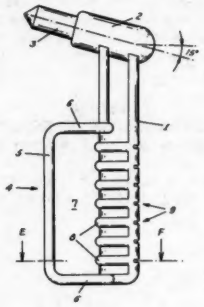
1. An unlocking device for unlocking a vehicle door without a key, said vehicle door including a door lock linkage, the auctuation of which unlocks said vehicle door, said unlocking device comprising:
an elongated shank having a first end portion and a second end portion, said shank being provided with indicia means for marking the desired depth of insertion of said unlocking device into said vehicle door; and
a first linkage engaging means at said first end portion of said shank for selectively engaging and actuating said door lock linkage, said first engaging means including an arm defineing a first length, said arm having an outboard end provided with a U-shaped engaging member for releasably engaging said linkage.

4,882,955
ANGLED HEAD HAMMER
Davorin Savnik, Pod hrasti 34, Yu-61,000 Ljubljana, Yugoslavia
Filed May 26, 1987, Ser. No. 53,820
Int. Cl.[4] B25D *1/00*
U.S. Cl. 81—20 3 Claims



1. A hand-held hammer comprised of: a hammer head including a principal elongated body portion of square cross-sectional configuration having two pairs of diametrically opposed edges along the length thereof and having at least one nail striking surface of square shape at an end thereof; and an elongated hammer handle affixed at its forward end to the body portion of said hammer head, said hammer head being positioned with respect to said handle so that the pairs of said edges of said head extend in substantially perpendicular orientation to the long axis of said handle with the plane formed by a first pair of said edges oriented in alignment with said axis and the plane formed by the second pair of said edges oriented in perpendicular alignment with said axis whereby the square nail striking surface of said head provides right and left side corners of striking surface area for setting nails and the square shape of said nail striking surface oriented as determined by the aforesaid position of the hammer head with respect to said hammer handle improves the hammer user's nail driving accuracy during the rearward to forward and upward to downward swing movement of said hammer.

4,882,956
EMERGENCY HAMMER
Manfred Lang, Wuppertal, Fed. Rep. of Germany, assignor to Gebr. Happich GmbH, Fed. Rep. of Germany
Filed Aug. 16, 1984, Ser. No. 641,480
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1983, 3331081
Int. Cl.[4] B25D *1/00*
U.S. Cl. 81—20 6 Claims



1. An emergency hammer for smashing panes of glass, comprising:
a handle for being held by a hand, the handle having a head end;
a hammer head on the head end of the handle, the hammer head having a striking end for striking glass and a base end, opposite the striking end, the base end being connected to the head end of the handle, the hammer head extending a substantial length from the handle in one

direction only; said hammer having a point at its striking end; and

a relatively rigid protective loop on the handle for covering the hand holding the handle, the protective loop extending from the handle in the same direction as the hammer head; and

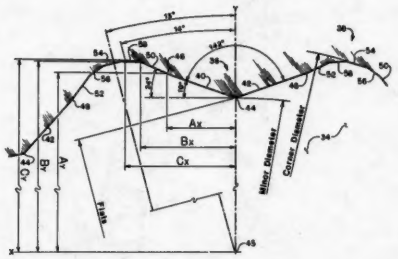
in which the hammer head extends obliquely from the handle to the striking end, the striking end extending beyond the head end of the handle.

4,882,957

SOCKET WRENCH OPENING

Richard B. Wright, Akron; Theodore M. Vozenilek, Canton, and Brent P. Fleming, Copley, all of Ohio, assignors to Wright Tool Company, Barberton, Ohio

Filed Dec. 16, 1988, Ser. No. 286,604
Int. Cl.[4] B25B *13/06*
U.S. Cl. 81—121.1 **6 Claims**



1. A wrench for turning a fastener nut having a central axis and an even-numbered plurality of flat bounding surfaces parallel to said axis with diametrically opposite pairs being parallel to each other, wherein said bounding surfaces intersect in adjacent pairs to form fastener corners, said wrench having a fastener nut engaging socket defining about a central socket axis, said socket defined by a plurality of uniformly spaced peripherally and radially disposed protuberances and plurality of uniformly spaced corner recesses disposed between said protuberances, each protuberance including side-by-side angularly related straight engaging surfaces at between 140°–150° outside obtuse angles to each other for registry with said flat surfaces on said fastener nut and complementary side surfaces outwardly diverging from said engagement surfaces, each engaging surface having a length substantially equal to 0.0867 times (×) the minor diameter of the fastener nut to be driven and said side surfaces diverging at least 3° outwardly from said engaging surface, each recess comprised of an arcuate surface defined by a circle about the central axis of said socket and lateral surface converging from said side surfaces of adjacent protuberances outwardly toward said arcuate surface.

4,882,958

STACKING SOCKET WRENCH SET

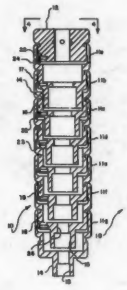
Richard L. McNeeley, 3088 W. 5825 South, Roy, Utah 84067

Filed Dec. 5, 1988, Ser. No. 283,077
Int. Cl.[4] B25B *13/06*
U.S. Cl. 81—124.4 **9 Claims**

1. A socket wrench set comprising:

a plurality of individual sockets each having a working end with a cavity sized and shaped to fit one of a series of bolt heads and nuts of various sizes; wherein

said sockets include means permitting the assembly of any number thereof together end to end in any desired order, irrotationally with respect to each other, without regard to the relative positions of the individual sockets within



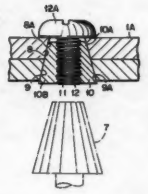
the stack, to form a torque transmitting stack of said sockets.

4,882,959

HAND TOOL

Yuichi Sakai, Sanjo, Japan, assignor to Top Kogyo Co., Ltd., Sanjo, Japan

Filed Oct. 31, 1988, Ser. No. 265,825
Int. Cl.[4] B25B *7/06*
U.S. Cl. 81—416 **10 Claims**



1. A hand tool with two pivoted arms comprising:

a pair of arm members having respective handles at the rear ends thereof, pivoting through-holes formed in said arm members, each said through-hole having a large-diameter portion and a smaller-diameter portion, the large-diameter portion of a first said through-hole adjoining the smaller-diameter portion of a second said through-hole so that together said through-holes form a continuous tapered surface extending through both of said arm members;

a frusto-conical tapered pin inserted into the large-diameter end of said second pivoting through-hole and having an axis common to that of said through-holes; and

a fixing member inserted into the smaller-diameter portion of said first pivoting through-hole engaged with the tapered pin.

4,882,960

LAWN MOWER BLADE LOCK

Jack L. Kugler, 746 NE. 43rd St., Topeka, Kans. 66617

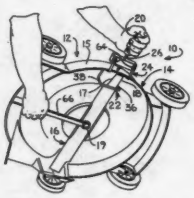
Filed Dec. 5, 1988, Ser. No. 279,993
Int. Cl.[4] B23Q *3/00*; B23P *19/04*
U.S. Cl. 81—488 **15 Claims**

1. A lawn mower blade lock for securing a blade against rotation relative to a deck of a rotary lawn mower, comprising:

a handle;

a blade-constraining barrier coupled with the handle; and

means for securing the barrier and the handle to the deck as a unit with the blade constrained by the barrier whereby



to fix both the blade and the lock against rotation relative to the deck.

4,882,961

CUTTING PORTAL OF AN ULTRA-HIGH PRESSURE FLUID JET CUTTING SYSTEM

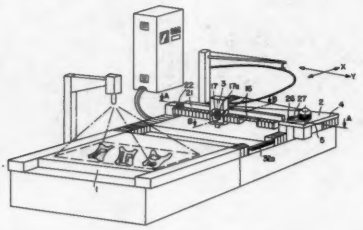
Siegfried Zabinski, Bielefeld; Klaus Biervert, Spenge, and Gerd Küpper, Bad Salzuflen, all of Fed. Rep. of Germany, assignors to Durkopp Systemtechnik GmbH, Fed. Rep. of Germany

Filed Oct. 30, 1987, Ser. No. 115,430

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1986, 3637617

Int. Cl.[4] B26F *3/00*

U.S. Cl. 83—177 **9 Claims**



1. A cutting portal for a high-pressure fluid jet cutting system, comprising:

a cutting table; the cutting portal being disposed on the cutting table and being movable along the cutting table transversely to a lengthwise direction of extension of the cutting portal;

the cutting portal comprising two thin plates spaced apart from each other and having a lengthwise dimension extending in the lengthwise direction of extension of the cutting portal; a honeycomb material being disposed between the thin plates for defining the cutting portal together with the plates;

a first bearing shell and a second bearing shell disposed in the cutting portal and spaced apart from each other along the cutting portal; the bearing shells being introduced perpendicular to the surface of the thin plates into the honeycomb material, and the bearing shells being connected to the honeycomb material; a first bearing shaft and a second bearing shaft each being supported in a respective one of the bearing shells;

a guide rail extending along the lengthwise direction of extension of the cutting portal, and means extending from the guide rail into the honeycomb material for supporting the guide rail to the honeycomb material;

a cutting head support for supporting the fluid jet; the cutting head support being supported to move along the guide rail along the length dimension of the cutting portal and the plates;

means supported on the bearing shafts and connected with the cutting head support for moving across the space between the bearing shafts and thereby moving the cutting head support along the length of the cutting portal.

4,882,962

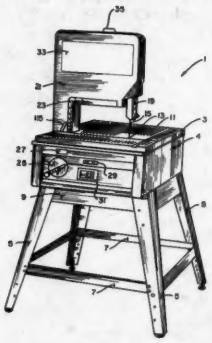
ANGULARLY ADJUSTABLE BAND SAW

Daniel A. Terpstra, St. Louis County, and Steven H. Plume, St. Charles County, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Aug. 19, 1988, Ser. No. 234,156

Int. Cl.[4] B23D *55/02*; B27B *13/04*

U.S. Cl. 83—812 **17 Claims**



1. A band saw comprising:

a supporting worktable having a worktable surface on which a workpiece rests and a saw blade slot extending through the worktable surface;

a frame support fixed to the worktable below the worktable surface and having an elongated channel in said frame support extending generally parallel to said worktable surface;

a movable generally C-shaped frame having upper and lower generally parallel legs with corresponding upper and lower band saw supporting wheels rotatably mounted on said upper and lower legs, said upper leg and upper band saw supporting wheels being positioned above said worktable surface, said lower leg and lower band saw supporting wheel extending below said worktable surface and having a complementary shaped element slidably supported within the elongated channel of said frame support;

said lower band saw supporting wheel having a rotatable shaft in alignment with and extending through the complementary shaped element of said C-shaped frame lower leg;

motor means mounted to said C-shaped frame on an opposite side of said frame support from said lower rotating band saw supporting wheel and being connected to the rotatable shaft of said lower band saw supporting wheel;

an endless band saw blade mounted for movement about said upper and lower band saw supporting wheels including through the saw blade slot in the worktable surface; and

adjustment means for tilting said C-shaped frame including the band saw blade mounted on said upper and lower band saw supporting wheels relative to said worktable surface, said adjustment means during tilting movement thereof causing the complementary shaped slidable supporting element on the lower leg of said C-shaped frame to move in the elongated channel of said frame support to provide the desired angular adjustment of the saw blade relative to

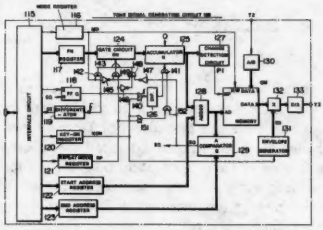
the worktable surface without changing the point of intersection of the saw blade relative to the worktable surface.

4,882,963

ELECTRONIC MUSICAL INSTRUMENT WITH EDITING OF TONE DATA

Tetsuji Ichiki, Hamamatsu, Japan, assignor to Yamaha Corporation, Shizuoka, Japan

Division of Ser. No. 917,909, Oct. 10, 1986, Pat. No. 4,696,214. This application Jul. 9, 1987, Ser. No. 71,645
Claims priority, application Japan, Oct. 15, 1985, 60-229081
The portion of the term of this patent subsequent to Sep. 29, 1987, has been disclaimed.
Int. Cl.[4] G10H *7/00*
U.S. Cl. 84—1.01 **6 Claims**



1. An electronic musical instrument comprising:

mode selection means for selecting one of a plurality of modes including first and second modes, said mode selection means outputting a mode signal representative of the selected mode;

transducer means for converting a tone into a tone signal representative of said tone;

memory means comprising a plurality of storage areas each having a plurality of addresses;

read/write rate designation means for outputting a first rate signal designating a first rate of access to the addresses of said memory means when said mode signal represents said first mode, and for outputting a second rate signal designating a second rate of access to the addresses of said memory means when said mode signal represents said second mode;

storage area designation means for designating one of said plurality of storage areas and for outputting an area signal indicative of the designated storage area;

read/write control means responsive to said mode signal, said first rate signal and said area signal for storing data representing said tone signal into the addresses in said designated storage area only at said first rate when said mode signal represents said first mode, and responsive to said mode signal and said second rate signal for reading data from the addresses in said plurality of storage areas at said second rate when said mode signal represents said second mode; and

tone generating means for generating a tone based on the data read from said memory means.

4,882,964

PERCUSSIVE MUSICAL TONE GENERATOR SYSTEM

Eisaku Okamoto, and Ikuo Komatsu, both of Shizuoka, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

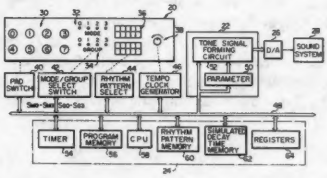
Filed May 26, 1988, Ser. No. 199,321
Claims priority, application Japan, May 27, 1987, 62-130240; May 27, 1987, 62-130241; May 27, 1987, 62-130242
Int. Cl.[4] G10H *1/42, 7/00*
U.S. Cl. 84—611 **18 Claims**

4. A musical tone generator system comprising

(a) tone generator instructing means operable for instructing selective generation of a plurality of different kinds of musical tones,

(b) tone signal forming means having a plurality of tone signal forming channels, said tone signal forming means being operative to form in and output from each of said tone signal forming channels a tone signal which corresponds to the tone designated by said tone generation instructing means,

(c) tone signal allocating means for controlling the formation of the tone signal corresponding to the tone designated by said tone generation instructing means by allocating said tone signal to one of said tone signal forming channels,



(d) time measuring means respectively corresponding to said tone signal forming channels for measuring the residual time duration for which the generation of the tone being generated under the control of said tone signal is to be continued, said residual time duration being measured for each of said different kinds of musical tones, and

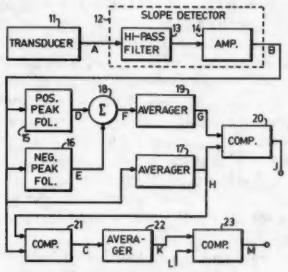
(e) allocation control means for controlling the allocation of the tone signal corresponding to the tone designated by said tone generation instructing means, the allocation of the tone signal being controlled on the basis of the residual time duration measured by said time measuring means.

4,882,965

DIRECTION OF BOWING DETECTION METHOD AND APPARATUS

Richard E. D. McClish, 2200 Chapdelaine apt. 1203, Ste-Foy, Quebec, Canada G1V-4G8

Continuation of Ser. No. 92,086, Sep. 2, 1987, abandoned. This application Apr. 4, 1989, Ser. No. 333,852
Int. Cl.[4] G09B *15/00*; G10G *1/00*; G10H *3/18*
U.S. Cl. 84—1.16 **6 Claims**



1. A device to produce an indication of the direction of bowing of a vibrating element of a musical instrument which is bowed in more than one direction of bowing, said device comprising:

transducer means responsive to audio-frequency vibrations of said vibrating element in a plane determined by a direction of said bowing and producing an audio-frequency tone signal composed of audio-frequency cycles corre-

sponding in amplitude and in frequency to said audio-frequency vibrations, each said audio-frequency cycle minimally comprising a first change in magnitude occurring at a first rate and having a first polarity, and a second change in magnitude occurring at a second rate different from said first rate and having a second polarity opposite said first polarity,

means to produce a signal indicative of said first rate of said first change in magnitude of a said audio-frequency cycle of said audio-frequency tone signal,

means to produce a signal indicative of said second rate of said second change in magnitude of said audio-frequency cycle of said audio-frequency tone signal, and

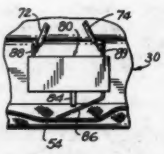
means to produce a signal indicative of the polarity of one of said changes in magnitude of said audio-frequency cycle of said audio-frequency tone signal in response to said signals indicative of said first and of said second rates, whereby said signal indicative of said polarity is indicative of the direction of said bowing of said vibrating element.

4,882,966

MUSICAL JEWELRY BOX

Barry Silverman, 3 Melrose Ln., West Nyack, N.Y. 10994

Filed Apr. 18, 1989, Ser. No. 339,730
Int. Cl.[4] G10F *1/06*
U.S. Cl. 84—94.2 11 Claims



1. A musical jewelry box comprising:

a box for containing jewelry including first and second sections joined by a hinge and having a pair of opposed open cavities and a pair of opposed, corresponding rims defining openings to said cavities, said sections contacting one another when said box is closed, and separated from one another, when said section are opened in clam shell fashion along the hinge;

actuatable music means, located within said cavity of said first section, capable of generating a melody;

switch means, having pressure activated means for deactivating said music means when pressure is applied and for activating said music means when pressure is released, said switch means connected to said first section, within said cavity, with its said pressure activated means located adjacent to said rim of said first section;

connection means, located within said cavity of said first section, for connecting said switch means to said music means;

essentially rigid liner means inserted within said cavity and providing a compartment within said cavity for containing and thereby hiding said music means, switch and connection means from view when said box is open, and including deformable means, covering said pressure activated means, for transmitting pressure to said pressure activated means; and

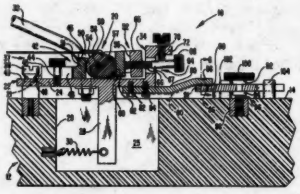
pressure applying means, associated with said second section and acting against said deformable means, for applying pressure to said pressure activated means when said box is closed in order to deactivate said music means.

4,882,967

TREMOLO APPARATUS HAVING BROKEN STRING COMPENSATION FEATURE

Floyd D. Rose, 5610 145th Ave., SE., Bellevue, Wash. 98006

Filed Apr. 21, 1988, Ser. No. 184,292
Int. Cl.[4] G10D *3/14*
U.S. Cl. 84—313 8 Claims



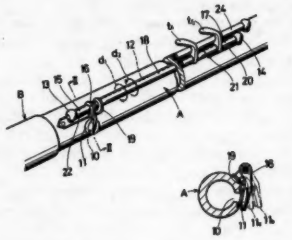
1. In a guitar comprising a tremolo base plate to which the strings of the guitar may be secured, tremolo means for moving the tremolo base plate in a first direction from a tuned position toward the guitar body and in a second direction from the tuned position away from the guitar body to produce tremolo sounds, and a locking member for selectively preventing the tremolo base plate from moving in said first direction, the improvement that said guitar comprises elevation adjusting means for adjusting the elevation of said locking member relative to the said guitar body.

4,882,968

TRILL MECHANISM FOR WIND INSTRUMENT

Masayuki Yamada, Minami 2-23, Nangodori 2-Chome, Shiroishi-ku, Sapporo-Shi, Hokkaido, Japan

Filed Jan. 23, 1989, Ser. No. 299,388
Claims priority, application Japan, Jun. 27, 1988, 63-156975
Int. Cl.[4] G10D *7/02*
U.S. Cl. 84—384 7 Claims



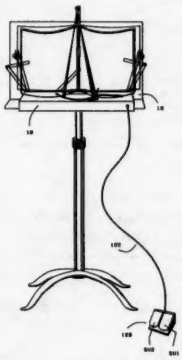
1. A trill mechanism for a musical instrument such as a flute or a piccolo, comprising a middle joint in the form of a hollow tube having a single trill tone hole bored at a particular location thereof, a trill cup mounted on said middle joint for movement from and to a closing position in which said trill cup closes said trill tone hole of said middle joint, a spring for urging said trill cup to the closing position, and manually operable means for alternatively moving said trill cup to a first open position in which said trill tone hole of said middle joint is open with a first opening or to a second open position in which said trill tone hole is open with a second opening which is greater than the first opening.

4,882,969

PAGE TURNING DEVICE

Tom L. Ricca, 1413 Wyandotte Rd., Columbus, Ohio 43212

Filed Sep. 12, 1988, Ser. No. 242,628
Int. Cl.[4] G10G *7/00*
U.S. Cl. 84—487 **20 Claims**



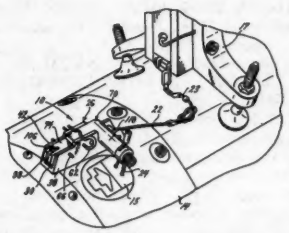
1. A page turning device for a book, comprising:
a. a securing means to adjustably fix a book into an operative position which would allow material to be suitably exposed for reading;
b. a plurality of rods rotatably hanging at their top ends around an adjustably fixed hanger;
c. each of said rods being programmably positioned in sequence behind a group of at least one leaf of said book;
d. guiding means for the lower ends of said rods to travel in a predetermined path;
e. said guiding means allowing the lower end of each of said rods to travel freely between the two extremes of said predetermined path, maintaining said rods in their sequence when they are to travel in groups or when they are lined up to wait for operations;
f. a first limiting stop means located near one of said extremes of said path to provide a firm and spatially precise stopping to the lower end of one of said rods that is made ready to act in the operation of the invention;
g. a second limiting stop means adjustably located near the second of said extremes of said path to provide a firm and spatially precise stopping to the last one of said rods which was made to travel from said first limiting stop means toward said second limiting stop means within the allowance of said guiding means;
h. pushing means to push the group of said rods which crowd near said first limiting stop toward the rod that is firmly and precisely stopped by said first limiting stop, and to push the group of rods which crowd near said second limiting stop toward the rod that is stopped by said second limiting stop means;
i. selecting means to choose a present active rod, defined as the one of said rods that is firmly and precisely stopped by said first limiting stop means, and to isolate said present active rod from the rods that are pushed toward it;
j. driving means to act on said selecting means to cause said present active rod to overcome momentarily said firm and spatially precise stopping by said first limiting stop means and to travel along said guiding means, in the direction from the first stopping means area to the second stopping means area, defined as the forward direction, pushing along with it a group of at least one leaf behind which said present active rod is positioned, and thus causing, by proper design of said predetermined path, the turning of said group of at least one leaf and exposing the next set of pages for reading;
k. updating means to cause the rod positioned next to said present active rod to take the position of the next active rod by causing said first limiting stop means to provide again, after being overcome by said present active rod, immediately said firm and precise stopping to the lower end of said next active rod;
l. said driving means causing said present active rod to overcome said firm stopping by said second limiting stop means and to make said present active rod into said last one of said rods which is made to travel in said forward direction, within the allowance of said guiding means;
m. returning means to relocate said selecting means to a spatially precise stand-by position near said first limiting stop means, completing the process of making said next active rod into a new present active rod;
n. control means to activate on cue the actuation of said selecting means, driving means and returning means;
o. whereby, after a book has been adjustably fixed by said securing means and said plurality of rods has been programmably positioned in sequence each behind each group of at least one leaf of said book and said plurality of rods has been pushed toward the very first present active rod which has been made to be confined by said firm and spatially precise stopping of said first limiting stop means, and the sequentially first set of pages has been exposed for reading, the cue for a forward page turning would start said control means to activate said selecting means to choose said present active rod, then to activate said driving means to act on said selecting means to cause said present active rod to overcome momentarily said firm and spatially precise stopping by said first limiting stop means and to travel along said guiding means, turning a group of at least a leaf of said book and at the end of the course of said present active rod, locking open the next set of pages of said book for reading by virtue of said firm stopping by said second limiting stop means, then to activate said returning means to relocate said selecting means to said spatially precise stand-by location while said pushing means and updating means complete the making of said next active rod into a new present active rod, thus making the invention ready, in a repetitive manner, for the next cue for page turning again, until all the turnings are exhausted.

4,882,970

MOTION TRANSLATOR

Jay R. Kovar, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 4, 1989, Ser. No. 295,085
Int. Cl.[4] B64D *1/04*; F42C *5/00, 15/12*
U.S. Cl. 89—1.55 **15 Claims**



1. A motion translation device that converts an applied horizontal force to a generally vertical force, comprising:
a means for translating an applied horizontal force to a generally vertical force by a combination of confined sliding and rotational action, said means having a free end and slidably and rotationally confined end;

a means for slidably and rotationally confining said translating means between a first generally horizontal position and a second generally vertical position relative to said confining means;

a means for mounting said means for slidably and rotationally confining to another object;

and a means connected to said slidably and rotationally confined end of said translating means for communicating a generally horizontal force to said translating means.

4,882,971

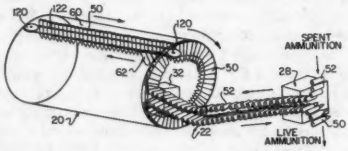
LINKLESS AMMUNITION TRANSPORTER

David P. Yanusko, Pottstown, Pa.; Harold C. McMillan, Cherry Hill, N.J., and Edmund G. Kline, West Chester, Pa., assignors to Teleflex, Incorporated, King of Prussia, Pa.

Filed May 27, 1988, Ser. No. 200,014

Int. Cl.[4] F41D *10/02, 10/26;* **F41F** *9/02, 9/06*

U.S. Cl. 89—33.02 **13 Claims**



1. A transporter for storing and feeding linkless rounds of ammunition, the ammunition being at least one of live rounds and spent cartridge casings, the transporter comprising:

a generally cylindrical drum frame assembly defining an axis and having a plurality of longitudinally aligned rails facing inwardly toward the axis, the rails having means for engaging bases of the rounds for retaining the rounds between adjacent ones of the rails in rows receiving a plurality of said rounds;

an internal conveyor operable for one of loading and unloading the rounds along successive ones of the rows, the internal conveyor having means engaging at least one of the rounds in successive ones of the rows, said means being movable longitudinally of the axis; and,

drive means operatively connecting the drum frame assembly and the internal conveyor, the drive means operating the internal conveyor to move said rounds and the drive means also stepwise advancing the internal conveyor from one row to a next successive row upon completion of said one row.

4,882,972

DUAL CALIBER AMMUNITION HANDLING SYSTEM

Eugene B. Raymond, Essex Junction, Vt., assignor to General Electric Company, Burlington, Vt.

Filed Aug. 15, 1988, Ser. No. 232,410

Int. Cl.[4] F41D *10/22;* **F41F** *9/02;* **B65G** *37/00*

U.S. Cl. 89—34 **34 Claims**

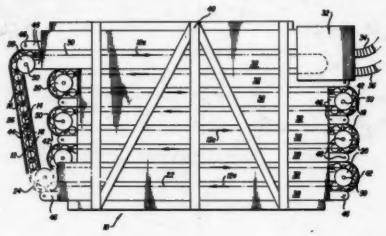
1. An article handling system comprising, in combination:

A. a pair of conveyor chains;

B. spaced sets of opposed sprockets about which said conveyor chains are engaged and trained in parallel spaced relation through a predetermined conveyor path;

C. a succession of transverse article carrier elements interconnecting said conveyor chains at regularly spaced intervals along the lengths thereof, each adjacent pair of said carrier elements providing first opposed surface formations defining therebetween a first position for accepting an article of one configuration and providing second opposed surface formations defining therebetween a second position for accepting an article of a different configuration; and

D. guide means stationed along said conveyor path for maintaining articles of either configuration in their accepted positions between adjacent pairs of said carrier elements during article conveyance.



4,882,973

MULTIPLE FUNCTION COMBINED WEAPON

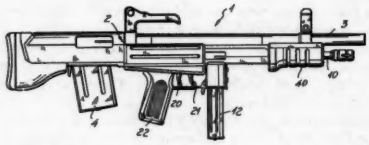
Armando Piscetta, Via delle Fornaci, 4 -- 17025, Loano (Savona), Italy

Filed Jun. 1, 1988, Ser. No. 200,835

Claims priority, application Italy, Jun. 2, 1987, 20762 A/87

Int. Cl.[4] F41C *21/06*

U.S. Cl. 89—1.41 **6 Claims**



1. A multiple function combined weapon for firing different types of ammunition, said multiple function combined weapon comprising a body supporting a first shot gun barrel, a first magazine for loading said first shot gun barrel arranged at a central portion of said body, under said first barrel there being arranged a second barrel for an automatic weapon, a second magazine for loading said second barrel, said second magazine being arranged at a front portion of said body, between said first and second magazines there being provided two triggers selectively actuated for firing said first barrel by one trigger of said two triggers and for firing said second barrel by another trigger of said two triggers.

4,882,974

METHOD FOR INCREASING THE HITTING PROBABILITY OF MULTI-BARREL MACHINE WEAPONS

Ingolf Reuter, Dornhan; Dietrich Hoffmann, Schramberg, and Harald Weisser, Oberndorf, all of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Oberndorf, Fed. Rep. of Germany

Continuation of Ser. No. 68,431, Jun. 30, 1987, abandoned. This application Dec. 14, 1988, Ser. No. 285,332

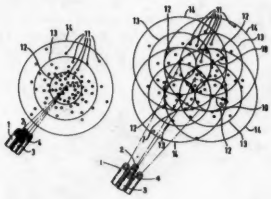
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1986, 3623650

Int. Cl.[4] F41G *3/04*

U.S. Cl. 89—41.16 **1 Claim**

1. In a method for increasing the probability of hits from multi-barreled machine weapons, including effectuating an adjustment of the weapon barrels to achieve a predetermined spread for the hits from said weapons over target areas; the improvement comprising: associating a target area having its

own middle hitting point location with each said weapon barrel; measuring a distance from a middle hitting point location for each barrel where an enclosing circle formed at said distance encloses one standard deviation of hits for each associated barrel, taking an average of said distances for the total number of barrels; orienting the hitting point locations of all of said weapon barrels at the same distance from each other and



additionally at the same distance in a vertical and lateral spacing relative to the middle hitting point location of all of said weapon barrels; and then spreading the middle hitting point location of all of said weapon barrels by said average whereby the density of hits at a limited increasing deviation from the middle hitting point location of all of said weapon barrels remains at least substantially constant.

4,882,975

PARKING MAINTAINING APPARATUS FOR BRAKE BOOSTER

Morihiko Shimamura; Satoru Satoh, and Michio Kobayashi, all of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 283,061

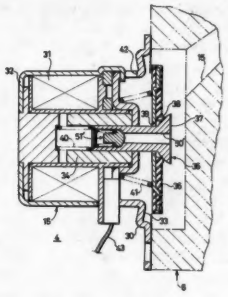
Claims priority, application Japan, Dec. 25, 1987, 62-328927,

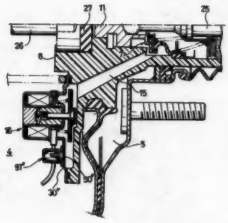
Int. Cl.[4] F15B *9/00*

U.S. Cl. 91—376 R **5 Claims**

1. A parking maintaining apparatus for brake booster which comprises a power piston slidably disposed within a shell, a valve mechanism received in a valve body formed by an axial portion of the power piston, a constant pressure chamber defined forwardly of the power piston as viewed in the direction of operation thereof and communicating with a source of negative pressure, a variable pressure chamber defined rearwardly of the power piston as viewed in the direction of operation thereof, a plurality of passages formed in the valve body and including a constant pressure passage providing a communication between the valve mechanism and the constant pressure chamber, a variable pressure passage providing a communication between the valve mechanism and the variable pressure chamber and a pressure passage providing a communication between the valve mechanism and a source of high pressure, an input shaft for operating a valve plunger, which forms part of the valve mechanism, to switch the communication of the respective passages, and a solenoid-operated open/close valve for opening and closing the constant pressure passage;

the parking maintaining apparatus being characterized by a relief valve for relieving a pressure within the constant pressure passage extending between the valve mechanism and the solenoid-operated valve into the constant pressure





chamber whenever such pressure reaches or exceeds a given value.

4,882,976

BRAKE BOOSTER

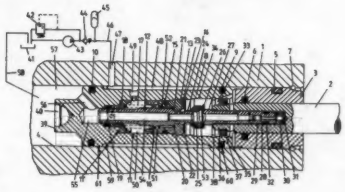
Andreas Abbing, Ludwigsburg; Hannes Bertling, Vaihingen/-Enz; George Kehl, Stuttgart; Robert Mergenthaler, Markgroningen; Dietmar Rischen, Korntal-Munchingen; Ernst-Dieter Schäfer, Pliezhausen; Edgar Schmitt, Vaihingen/Enz, and Heinz Siegel, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 3, 1988, Ser. No. 189,893

Claims priority, application Fed. Rep. of Germany, May 9, 1987, 3715564

Int. Cl.[4] F15B *9/10*

U.S. Cl. 91—376 R **29 Claims**



1. A brake booster in a housing for a master cylinder which comprises a guide bushing (3) in a face end of said housing, a piston rod (2) supported by said guide bushing protruding into the housing for transmitting a brake force, a servo piston slidably supported in the housing in alignment with said guide bushing, a work chamber provided in said servo piston for

receiving brake fluid derived from a brake fluid supply, a first valve that controls brake fluid flow to said work chamber, a second valve that controls fluid flow from said work chamber to a return line to a supply container (41), said first valve for controlling brake fluid flow to said work chamber being embodied by a valve cone (12) operative relative to a first valve seat formed in a valve bushing (13), said valve cone extending axially in a blind bore (11) of said servo piston (8) in axial alignment with said valve bushing (13), a chamber (50) formed between said valve cone (12) and said servo piston (8), said chamber (50) communicates via a radial bore (49), an annular chamber (48) formed between the servo piston (8) and the housing (1), an inlet bore (47) connected with said brake fluid supply, said first valve controls brake fluid flow from said chamber (50) to said work chamber, said valve cone (12) includes a collar (16) thereon within said chamber (50), said collar being guided with radial play in said valve bushing (13), and said second valve for controlling the outflow of the brake fluid from said work chamber (33) is formed by a first element (24, 25, 62, 71, 79) connected to said valve cone (12) which cooperates with a second element (28, 78, 83, 100) connected to said piston rod (2).

4,882,977

ROTARY ACTUATOR

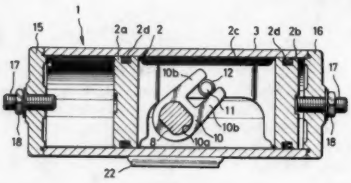
Toshio Himeno, Ashiya; Hitoshi Shimizu, Takarazuka, and Satoshi Shinkai, Nishinomiya, all of Japan, assignors to Konan Electric Co., Ltd., Nishinomiya, Japan

Continuation of Ser. No. 841,394, Mar. 19, 1986, abandoned. This application Aug. 24, 1988, Ser. No. 236,323

Claims priority, application Japan, Mar. 23, 1985, 60-057553; Mar. 23, 1985, 60-057554; Dec. 13, 1985, 60-191010; Mar. 13, 1986, 61-053753

Int. Cl.[4] F01B *31/12, 9/04*

U.S. Cl. 92—5 R **6 Claims**



1. A rotary actuator comprising

a piston;

a cylinder case having a center axis for containing said piston for reciprocatory sliding movement;

an output shaft having a center axis rotatably supported by said cylinder case and extending in a direction perpendicular to the center axis of the cylinder case; and

a connecting member connecting said piston to said output shaft for converting a reciprocatory linear movement of the piston into a reciprocatory rotary movement of the output shaft;

wherein the improvement comprises:

a pedestal extending outwardly from support portions of the cylinder case for supporting the output shaft at a free end thereof, said pedestal being formed with a substantially square elevated portion defining a depressed portion, and a plurality of projections constituting dividing lines of a scale which are formed integrally with the pedestal at the depressed portion, said projections being spaced apart from each other by a predetermined angle and located symmetrically on the left and right with respect to a plane extending through the center axis of the output shaft and perpendicular to the center axis of the cylinder case, a pointer being attached to the output shaft and an attaching position of said pointer relative to said output shaft being able to be changed by a predetermined angle.

4,882,978

BELLOWS PNEUMATIC SYSTEM

Jon Bruggeman, North Oaks, and Dallas W. Simonette, Stacy, both of Minn., assignors to Power Flo Products Corp., Minneapolis, Minn.

Division of Ser. No. 180,217, Apr. 11, 1988, Pat. No. 4,824,340. This application Mar. 20, 1989, Ser. No. 325,992

Int. Cl.[4] F01B *19/00;* **F16J** *3/04;* **B29C** *43/00*

U.S. Cl. 92—34 **10 Claims**

1. Pneumatic system comprising, in combination: a bellows having a generally rectangular cross section, with the bellows comprising, in combination: a generally flat top, a generally flat bottom, first and second accordion sides having longitudinal fold lines, and first and second ends; a first tube integrally formed with and extending from the first end of the bellows generally parallel to the longitudinal fold lines of the accordion sides; and a second tube integrally formed with and extending from the second end of the bellows generally parallel to the longitudinal fold lines of the accordion sides and in line with the first tube, with the bellows and first and second tubes being formed of homogeneous material.

4,882,979

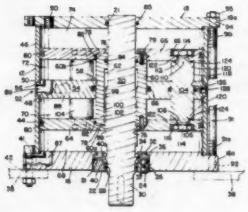
DUAL-PISTON ACUATOR

Paul P. Weyer, 48811-284th Avenue S. E., Enumclaw, Wash. 98022

Filed Oct. 7, 1988, Ser. No. 255,067

Int. Cl.[4] F01B *7/16;* **F16H** *55/02;* **F16K** *31/124, 31/53*

U.S. Cl. 92—33 **39 Claims**



1. A fluid-powered actuator comprising:

a body having first and second axially spaced-apart end walls, and first end and second end circumferential sidewalls, said first end sidewall extending axially from said first body end wall and terminating in a first circumferential free end portion and said second end sidewall extending axially from said second body end wall and terminating in a second circumferential free end portion axially spaced apart from said first circumferential free end portion to define an annular space therebetween;

an axially transverse bulkhead positioned between said first and second body end walls and having a perimeter portion extending into said annular space, said bulkhead being adjustably rotatable in said space to angularly position said bulkhead in a desired stationary position relative to said body for fluid-powered operation of the actuator, said bulkhead having a central aperture therethrough;

clamping means for selectively clamping said bulkhead perimeter portion in said annular space between said first and second circumferential free end portions to hold said bulkhead stationary with respect to said body during fluid-powered operation of the actuator, and for selectively unclamping said bulkhead to permit adjustable rotation of said bulkhead with respect to the body;

a first piston head disposed in said body for axial reciprocating movement, said first piston head being positioned between said bulkhead and said first body end wall and defining a first fluid-tight chamber between said first body end wall and said first piston head and a second fluid-tight chamber between said first piston head and said bulkhead, said first piston head having a central aperture therethrough;

a second piston head disposed in said body for axial reciprocating movement, said second piston head being positioned between said bulkhead and said second body end wall and defining a third fluid-tight chamber between said bulkhead and said second piston head and a fourth fluid-tight chamber between said second piston head and said second body end wall, said second piston head having a central aperture therethrough;

connector means for fixedly interconnecting said first and second piston heads together against axial and rotational movement relative to each other such that said first and second piston heads form a piston assembly for reciprocating movement within said body in unison;

an axially entending, rotatable shaft positioned within said body and supported for rotation relative to said body, said shaft extending through said first piston head aperture, said bulkhead central aperture and said second piston head aperture;

first torque-transmitting means for transmitting torque between said piston assembly and said bulkhead in response to reciprocating movement of said piston assembly;

second torque-transmitting means for transmitting torque between said piston assembly and said shaft in response to reciprocating movement of said piston assembly;

first seal means for providing a fluid-tight seal between said first piston head and said body;

second seal means for providing a fluid-tight seal between said second piston head and said body;

third seal means for providing a fluid-tight seal between said shaft and said piston assembly; and

fourth seal means for providing a fluid-tight seal between said connector means and said bulkhead.

4,882,980

TANDEM BRAKE BOOSTER

Masao Arino, and Jinki Takase, both of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Sep. 9, 1988, Ser. No. 243,057

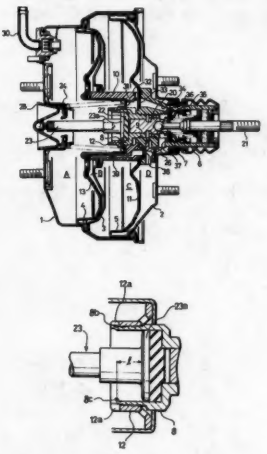
Claims priority, application Japan, Oct. 28, 1987, 62-164861[U]

Int. Cl.[4] F01B *19/02;* F15B *9/10*

U.S. Cl. 92—48 **6 Claims**

4. A tandem brake booster including a hub fitted over an axial portion of a valve body in a manner to prevent its withdrawal in the forward direction therefrom, a nut threadably engaged with the outer periphery of the hub at its front end for securing the hub to the valve body, and a push rod slidably fitted into the front end of the hub, the nut being formed with a plurality of recesses at given positions therein; and

means formed on said hub for preventing both (1) withdrawal of said push rod forwardly from said hub and (2) rotation and corresponding unthreading of said nut with respect to said hub, said preventing means formed on said hub comprising stops extending radially inward for abutment against an end of the push rod and further comprising anti-rotation locks extending radially outward for engagement with the recesses to provide an integral connection between the hub and the nut, both the stops and



the anti-rotation locks being radially aligned with corresponding ones of said recesses in said nut.

4,882,981

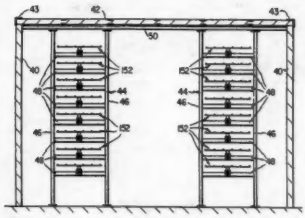
CONTINUOUS PROOF AND BAKE APPARATUS HAVING IMPROVED CONVEYOR SYSTEM

Carlos Bacigalupe, The Colony, and Michael J. Dobie, Plano, both of Tex., assignors to Stewart Systems, Inc., Plano, Tex.

Division of Ser. No. 127,372, Dec. 2, 1987. This application May 12, 1988, Ser. No. 192,914

Int. Cl.[4] A21B *1/42;* A21D *6/00*

U.S. Cl. 99—479 **1 Claim**



1. In a system for processing bakery products, an enclosure comprising;

a plurality of vertically disposed sidewalls;

a concrete curb for supporting the side walls above the floor of the enclosure to prevent damage to the sidewalls due to accumulations of condensation on the floor of the enclosure;

a horizontally disposed top wall extending between the upper ends of the side walls;

means for supporting the top wall for movement along a vertical axis thereby facilitating the release of pressure from the interior of the enclosure in the event of an internal explosion;

a spiral conveyor system for transporting the bakery goods through the enclosure; and

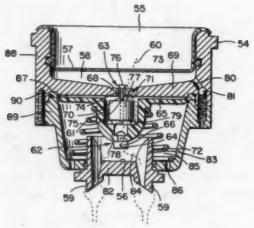
a plurality of ladders, each comprising internal and external vertical members adjacent to the interior and exterior perimeters of the spiral conveyor connected by a plurality of horizontal cross members, each of said cross members corresponding to, and supporting a tier of said spiral conveyors.

4,882,982

PERCOLATOR HOLDING PAN FOR ESPRESSO COFFEE MAKING MACHINES

Mario Muttoni, Frazione Cima, Italy, assignor to Spidem S.r.L., Milan, Italy

Filed Oct. 6, 1987, Ser. No. 105,130
Claims priority, application Italy, Oct. 8, 1986, 21942 A/86
Int. Cl.[4] A47J *31/00*
U.S. Cl. 99—295 **17 Claims**



1. A percolator holding pan for "espresso" coffee making machines comprising: a body adapted for fitting to a delivery assembly of an "espresso" coffee making machine, said body including a cavity formed therein having a bottom; a cupped percolator for holding coffee powder and housed within said cavity; at least one "espresso" coffee dispensing spout; a liquid flow path extending through said body between the cupped percolator and said at least one spout, said cupped percolator and said bottom of said cavity forming a compartment therebetween; pressure control means placed in said path for controlling the pressure downstream of the cupped percolator, said pressure control means comprising a restrictor effective to bring about a pilot backpressure, and a normally open shut-off valve interposed between the cupped percolator and the restrictor and being piloted by said backpressure.

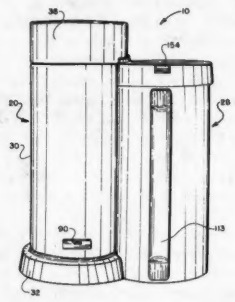
4,882,983

APPLIANCE FOR BREWING COFFEE/TEA

John J. Pastrick, Parma, Ohio, assignor to Mr. Coffee, Inc., Beford Heights, Ohio

Filed Jan. 17, 1989, Ser. No. 297,307
Int. Cl.[4] A47J *31/00*
U.S. Cl. 99—295 **17 Claims**

1. An appliance for making iced coffee/tea comprising:
a housing,
a reservoir within said housing for holding a predetermined amount of water,
a heating system for heating said water,
a receptacle for receiving brewed heated water,
a container dimensioned to be supported in said receptacle, said container having a chamber adapted to receive coffee, tea or the like and having dispensing means for dispensing brewed, heated water into said receptacle, said dispensing means including overflow means for dispensing said brewed, heated water into said receptacle after said water reaches a certain height in said chamber, and,



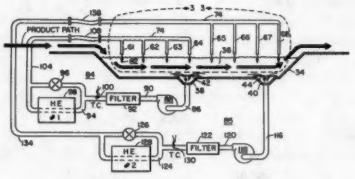
means for transferring heated water to said container, said means having orifice means for dispensing heated water into said chamber.

4,882,984

CONSTANT TEMPERATURE FRYER ASSEMBLY

E. Eugene Eves, II, Westford, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Oct. 7, 1988, Ser. No. 255,084
Int. Cl.[4] A47J *37/12*
U.S. Cl. 99—404 **26 Claims**



1. A fryer assembly comprising:
a tank containing cooking oil, said tank having a bottom;
means for draining oil from the bottom of said tank;
heat exchanger means for heating said oil drained from said tank to a predetermined temperature;
means for directing said heated oil downward into said tank from above said food and above said drain wherein the flow of oil in said tank is substantially downwardly from said directing means to said drain;
conveyer means for transporting food through said oil in said tank between said directing means and said draining means; and
means for submerging said food in said cooking oil when said food is being transported.

4,882,985

ROLL AND LOAD ROTISSERIE ASSEMBLY

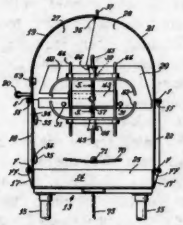
Frank W. Beller, Aurora, Ill., assignor to Belson Manufacturing Co., Inc., North Aurora, Ill.

Filed May 19, 1988, Ser. No. 195,847
Int. Cl.[4] A47J *43/18*
U.S. Cl. 99—426 **20 Claims**

1. A rotisserie assembly for attachment to the firebox of a grill comprising:
a cabinet housing including walls having means for mounting onto a firebox of a grill and including one wall thereof being removable from the other walls,

a hood means covering said cabinet housing and having two pivotally arranged hood members capable of pivoting relative to one another to open and close over said cabinet housing, spit means for holding food items to be cooked and including axle shaft means,

support means pivotally supporting said hood members and



including means for loading and unloading said spit means from said rotisserie assembly, and

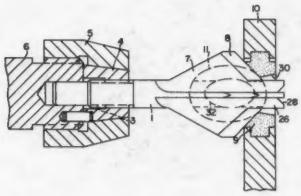
a pair of opposing support panels arranged at opposite end walls of said cabinet housing and wherein said hood members include opposing end walls, said opposing end walls of the hood members being pivotally engaged to said support panels.

4,882,986

PITTING PIERCER FOR FRUIT PITTING MACHINES

Antonio G. Diaz, Sevilla, Spain, assignor to Sociedad Anomina De Racionalcion Y Mecanizacion (Sadrym), Dos Hermanas Sevilla, Spain

Continuation-in-part of Ser. No. 24,326, Mar. 10, 1987, abandoned. This application Aug. 1, 1988, Ser. No. 226,764
Claims priority, application Spain, Nov. 11, 1986, 8601171
Int. Cl.[4] A23N *4/00*
U.S. Cl. 99—494 **4 Claims**



1. Apparatus for depitting and cutting olives into slices in an olive pitting machine, said apparatus comprising:

an elongated driving rod which is actuated in reciprocating motion to be moved backwardly and forwardly along its axis between an extreme rear position and an extreme forward position, said rod having a free end designated as a driving end;

an elongated generally cylindrical body having first and second opposite ends and having an axis coincident with the rod axis, the first end of the cylinder being connected to the driving end of the rod whereby the body is moved backwardly and forwardly along the axis by the corresponding movement of the rod;

first means for depitting and cutting an olive into slices, said means being constituted by a plurality of spaced thin elongated fins which are integral with the second end of the body and extend forwardly of the body in the axial direction, each fin having a first rear section with a triangular shape, one triangular side of the first section extending along the axis, a second triangular side extending forwardly and radially outward to an apex, a third triangular side extending forwardly and radially inward from the apex to a second forward section which extends forwardly and parallel to the axis, the third side having an exposed cutting blade, the second section having a forward edge which extends inclinedly rearwardly and radially inwardly toward the axis; and

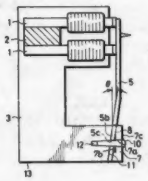
second means including an olive holder provided with a bore axially aligned with the axis lying in a plane perpendicular to the axis for supporting an olive having a major axis aligned with the axis, the olive having a rear end disposed in the bore and a front end, the front end of the olive being spaced from the front edges of the second sections when the rod is in its extreme rear position, the front edges of the second sections penetrating the olive to engage the pit to depit the olive as the rod moves into its extreme forward position, the cutting blades of the third sides of the first sections slice the depitted olive into a like plurality of separate slices disconnected for each other.

4,882,987

ATTACHING DEVICE IN A SPRING-CHARGED DOT PRINTER

Yasuo Sakai, and Morihito Wada, both of Osaka, Japan, assignors to NEC Home Electronics Ltd., Osaka, Japan

Continuation of Ser. No. 942,032, Dec. 15, 1986, abandoned, which is a continuation of Ser. No. 727,830, Apr. 26, 1985, abandoned. This application Apr. 6, 1988, Ser. No. 180,635
Claims priority, application Japan, Apr. 27, 1984, 59-62522; May 31, 1984, 59-111620; Jun. 29, 1984, 59-134405
Int. Cl.[4] B41J *3/10*
U.S. Cl. 101—13.04 **7 Claims**



1. A retaining plate assembly for use in a spring-charged dot impact printing head which comprises an attracting mechanism including a magnet, yokes and demagnetizing coils, a magnetic force of the magnet being used to attract upper end portions of leaf springs, which carry printing hammers, to the front ends of the yokes against elastic forces of the leaf springs; and a support having an inclined mounting surface on which lower end portions of the leaf springs are mounted, the lower end portions of the leaf spring and the retaining plate assembly being stacked on the inclined mounting surface in the stated order, said retaining plate assembly comprising

pressure applying means for applying substantially equal pressure of the leaf springs along the lower end portions thereof, including a member having at least one surface that is inclined with respect to a bottom surface of said support and which defines a recessed portion, said inclined surface of said member mating with said inclined mounting surface of said support, said lower end portions of the leaf spring and said member being stacked on the inclined surface of the support, said member having a second surface opposite said at least one surface, said second surface being perpendicular to the bottom surface of said support, and wherein said member has mounting holes which align with mounting holes in the lower end portions of the leaf springs; and

mounting means inserted through said mounting holes substantially in parallel with the bottom of the support, whereby even pressure may be applied by said member to the lower end portions of the leaf springs.

4,882,988

SHEET POSITIONING APPARATUS FOR SHEET-FED ROTARY PRINTING MACHINE

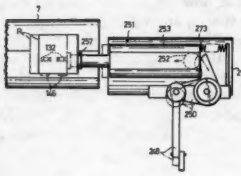
Yuji Yamaguchi, Mino, Japan, assignor to Sakurai Machine Trading Co., Ltd., Tokyo, Japan

Filed Oct. 29, 1987, Ser. No. 115,077

Claims priority, application Japan, Nov. 1, 1986, 61-261514; Feb. 5, 1987, 62-25391

Int. Cl.[4] B65H *9/00;* B41F *21/12, 21/14*

U.S. Cl. 101—232 5 Claims



1. A sheet-fed rotary printing machine comprising:

(a) a printing cylinder;

(b) an impression cylinder rotating in engagement with said printing cylinder;

(c) means to feed a sheet of printing paper to said rotating impression cylinder;

(d) means to hold said sheet on said impression cylinder for travel therewith; and

(e) first position limiting means for laterally positioning the printing paper in the direction perpendicular to the direction of feed of said printing paper while said paper is held on said impression cylinder and before the printing paper reaches a print point between said printing cylinder and said impression cylinder.

4,882,989

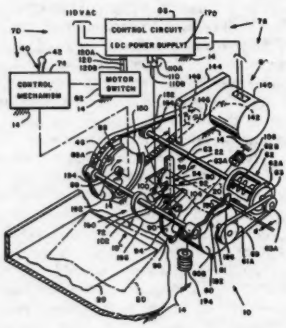
MAILING MACHINE INCLUDING IMPROVED SHEET ALIGNING MEANS

John R. Nobile, Fairfield, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Feb. 8, 1989, Ser. No. 307,793

Int. Cl.[4] B41F *13/24*

U.S. Cl. 101—235 12 Claims



1. In a mailing machine including a postage meter, wherein the postage meter includes rotary means for printing indicia on a sheet fed to the machine, wherein the machine includes means for driving the printing means, wherein the machine includes means for feeding a sheet fed thereto downstream in a path of travel through the machine, wherein the sheet feeding means includes an impression roller rotatably mounted beneath the rotary printing means, and wherein the impression roller has an inner end and an outer end, an improvement comprising:

a. means for aligning a sheet fed to the machine with the path of travel, the aligning means including a registration fence aligned with the path of travel, the aligning means including an elongate stop lever and a shaft on which the lever is pivotally mounted outboard of the outer end of the impression roller, the stop lever extending into the path of travel for pivoting a sheet fed thereto toward the registration fence, the aligning means including a cam rotatable with the printing means, the aligning means including a cam follower secured to the shaft and disposed in engagement with the cam; and

b. means for starting operation of the driving means in response to a sheet being fed to the machine, the driving means rotating the cam when the driving means is started, the stop lever located relative to the starting means for pivoting a sheet fed thereto before the driving means is started, and the cam dimensioned for rotating the cam shaft for lowering the stop lever out of the path of travel after the driving means is started.

4,882,990

INK ROLLER FOR ROTARY PRESS

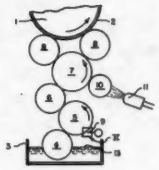
Yuji Ijichi, Hidaka, Japan, assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 8, 1988, Ser. No. 229,385

Claims priority, application Japan, Aug. 18, 1987, 62-126228[U]; Jan. 26, 1988, 63-7647[U]

Int. Cl.[4] B41F *1/46;* B21H *1/14*

U.S. Cl. 101—348 5 Claims



1. An ink metering roller for use in a lithographic rotary printing press in conjunction with a doctor blade that contacts the surface of the roller to remove excess ink therefrom, said roller comprising:

(a) a metal core of preselected strength and dimensions; and

(b) means providing a surface on said metal core having recesses to hold ink, said means including an outer ink metering layer covering said metal core, said outer layer consisting of:

(i) a matrix material constructed of an organic substance presenting an outer surface having oleophilic and hydrophobic properties, which material is worn away during contact with the doctor blade; and

(ii) a quantity of highly wear resistant particulate material dispersed throughout said matrix material, the wear of said matrix material caused by the doctor blade leaving some of said particulate matter protruding outwardly beyond the outer surface of said matrix material to define recesses holding quantities of ink and supporting the doctor blade.

4,882,991

CHANGE-OVER INKING UNIT OF A SHEET-FED ROTARY PRESS

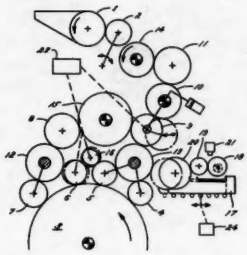
Claus Simeth, Offenbach am Main, Fed. Rep. of Germany, assignor to M.A.N. Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Continuation of Ser. No. 90,117, Aug. 27, 1987, abandoned. This application Jan. 10, 1989, Ser. No. 296,356

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1986, 3629081

Int. Cl.[4] B41F *31/10, 31/30*

U.S. Cl. 101—350 **5 Claims**



1. A sheet-fed rotary press comprising

main ink feed means,

a plate cylinder,

a plurality of transfer and applicator rolls coupled between said main ink feed means and said plate cylinder for defining an ink flow path for transferring ink in a downstream direction from said main ink feed means to said plate cylinder during printing operations, means mounting at least one of said transfer rolls which define said flow path for movement between an operative position in said flow path and an inoperative position out of engagement with said transfer and applicator rolls downstream thereof, means for selectively moving said at least one transfer roll from said operative position to said inoperative position for interrupting the transfer of ink from said main ink feed means to said plate cylinder and for isolating a short length roll group comprising only a portion of said plurality of transfer and applicator rolls, and

additional ink feed means, and means for selectively moving said additional ink feed means from an inoperative position out of engagement with said short length roll group to an operative position engaging said short length roll group for supplying ink to said plate cylinder through a shortened flow path via said short length roll group.

4,882,992

COMBINATION POWDER APPLYING AND/OR INFRARED DRYING ATTACHMENT FOR PRINTING PRESSES

Duane A. Schmoeger, Raleigh, N.C., assignor to Airtech Company, Inc., Cary, N.C.

Continuation of Ser. No. 225,802, Jul. 29, 1988, abandoned. This application Apr. 28, 1989, Ser. No. 344,809

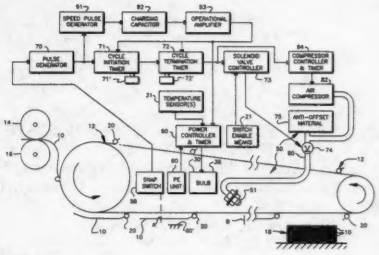
Int. Cl.[4] B41F *35/00*

U.S. Cl. 101—424.1 **20 Claims**

1. In combination with a printing press having a frame, sheet delivery means carried by said frame for conducting freshly printed sheets along a path of travel from a printing station to a sheet collection station, and anti-offset means for preventing ink offset between the sheets during collection thereof; the improvement in said anti-offset means comprising;

radiant heating means for, during operation thereof, directing radiant heat energy onto the sheets at a location along said path of travel spaced in an upstream direction from said collection station;

sheet spraying means disposed closely adjacent said radiant heating means for, during operation thereof, spraying anti-offset material upon the sheets at a location along said



path of travel downstream from said first-mentioned location and upstream from said collection station;

and selector switch means usable by a press operator for enabling operation of either one or both of said heating means and said spraying means.

4,882,993

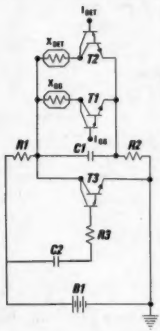
ELECTRONIC BACK-UP SAFETY MECHANISM FOR HAND-EMPLACED LAND MINES

Alvin Schwartzman, Kinnelon, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 5, 1988, Ser. No. 229,514

Int. Cl.[4] F42C *11/00*

U.S. Cl. 102—218 **1 Claim**



1. A munition device having means for insuring expiration of a predetermined time delay until arming of said munition, including circuit means which comprises:

a first N-P-N Darlington transistor pair (T3) with grounded emitter; an input series resistor-capacitor (R3-C2) timing delay circuit in series with an input to the base of said first transistor pair; an output from the collector side of said first transistor pair connected to a firing capacitor C1, said C1 capacitor connected to ground through a first bias resistor R2 and negatively biased from a battery (B1) through a second bias resistor R1; and second N-P-N Darlington transistor pair (T2) in parallel to said firing capacitor C1 feeding a detonator through the collector path of said second transistor pair, and; a third N-P-N Darlington transistor pair (T1) also in parallel with said

firing capacitor C1, feeding Gas Generator Means through the collector path of said third transistor pair, said second and third transistor pairs (T1 and T2) receiving respective Gas Generator Means and detonator inputs from a timer logic included in said munition device.

4,882,994

PARTICULATE FUEL COMPONENTS FOR SOLID PROPELLANT SYSTEMS

Preston L. Veltman, 212 Old Country Rd., Severna Park, Md. 21146, and Ove Hansen, 6560 Walnut Grove, Columbia, Md. 21045

Filed Jan. 28, 1988, Ser. No. 149,300

Int. Cl.[4] C06B *45/10*; C06D *5/06*

U.S. Cl. 102—290 **16 Claims**

1. A method for preparing a free-flowing, particulate fuel component for use in solid propellant systems, which comprises: dispersing particles of a fuel for a solid propellant having a particle size in the range 2–100 microns in a latex of a polymer, and spray drying the resultant dispersion.

4,882,995

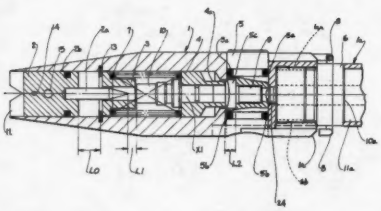
PROJECTILE FOR DARTING GUN

Henrik M. Henriksen, Holmeaveien 1, N-3130 Tele, and Egil O. Oen, Vestbyveien 46, N-1440 Drobak, both of Norway

Continuation-in-part of Ser. No. 96,339, Sep. 11, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 300,321

Int. Cl.[4] F42B *13/54*

U.S. Cl. 102—371 **13 Claims**



10. Projectile for a darting gun, comprising:

a front head housing a front ignition plunger arranged for axial rearward movement (L0) into a front head housing, and carrying a rearwardly extending striker means;

an ignition time delay element communicating with an urging means and a detonator housing carrying a detonator, said detonator housing being arranged for rotation about an axis transverse to the longitudinal axis of said front head housing;

a safeguarding means attached to said detonator housing and being arranged to take two positions:

a first position for holding said detonator housing in a position preventing the travel of said ignition time delay element, and a second position for allowing said ignition time delay element to travel into said detonator housing through a recess formed therein;

and a tubular body releasably attached to said front head housing and carrying explosive charges.

4,882,996

EXPLOSIVE PROJECTILE ASSEMBLY WITH A PROJECTILE BODY

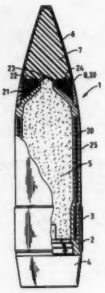
Erich Bock, Nurnberg, and Rainer Himmert, Lauf, both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nurnberg, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 263,725

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 3736842

Int. Cl.[4] F42B *13/18*

U.S. Cl. 102—496 **12 Claims**



1. Explosive projectile assembly including a projectile body and a hollow ballistic hood mounted in front of the projectile body; a head end portion of the projectile body being encompassed by said hood; said head end portion having a forwardly extending conical configuration protruding into the interior of said hood; an explosive charge being arranged within said projectile body; a base detonator attached to a tail end of said projectile body; a multiplicity of first preformed fragments embedded in a matrix of a polyurethane foam material being arranged intermediate the head end portion of said projectile body and the ballistic hood so as to at least fill an annulus in the interior of said hood formed intermediate the outer surface of the conical head end portion of the projectile body and the inner wall surface of said hood; and further preformed fragments being embedded in a peripheral wall surface of said projectile body.

4,882,997

TUBULAR PROJECTILES

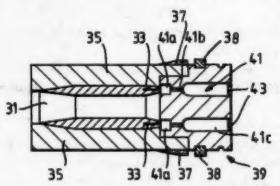
James E. Baxter, Cheshire, and Robert D. Poole, Stoke-on Trent, both of England, assignors to Royal Ordnance plc, London, England

Filed Nov. 27, 1987, Ser. No. 126,010

Claims priority, application United Kingdom, Nov. 28, 1986, 8628514

Int. Cl.[4] F42B *11/00, 11/16*

U.S. Cl. 102—503 **16 Claims**



1. A tubular projectile comprising a hollow tube and having formed in a rear end of a wall of the tube a recess of annular cross-section having inner and outer lateral extremities, the

annulus constituting the said recess being substantially coaxial with the portion of the projectile in which it is formed, the recess being filled with a tracer material which comprises a flexible cylindrical sleeve of a polymer-bonded pyrotechnic composition.

4,882,998

CAR FOR TRAVELING ALONG A SHEATHED CABLE

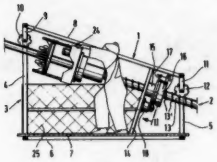
Xaver Lipp, Hohenstaufenstrasse 30, 7090 Ellwangen, Fed. Rep. of Germany

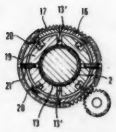
Filed Apr. 26, 1988, Ser. No. 186,464

Claims priority, application Fed. Rep. of Germany, May 13, 1987, 3715904

Int. Cl.[4] B61B *7/06*

U.S. Cl. 104—112 **18 Claims**





1. A car for traveling along a sheathed cable having a metal sheathing forming a rib projecting radially outwardly and extending axially along the cable in a helical path, said car comprising:

at least one drive member having coupling means for engaging the rib laterally and at least two relatively movable parts arranged one behind the other along the helical path of the rib, said parts trapping the cable therebetween and having biasing means for urging said parts against the cable; and

drive means, coupled to said drive member, for moving said drive member along a track concentric with a longitudinal axis of the cable, said drive means being stationary in axial directions of the cable relative to the car.

4,882,999

TRANSPORTATION SYSTEM OF A FLOATED-CARRIER TYPE

Teruo Azukizawa; Mimpei Morishita, both of Tokyo; Toyohiko Yokoyama, Urawa; Shigeo Takaki, Tokyo; Yoshio Yuyama, Tokyo, and Akitaka Noda, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 18, 1987, Ser. No. 135,084

Claims priority, application Japan, Dec. 19, 1986, 61-303442

Int. Cl.[4] B65G *54/02*; H02N *15/00*

U.S. Cl. 104—281 **6 Claims**

1. A transportation system of a floated-carrier type for transporting a cargo between predetermined positions, comprising:

a guide rail means formed of a ferromagnetic material and including a first rail, a second rail, and a third rail intersecting the first rail, each rail extending longitudinally;

a carrier for carrying the cargo;

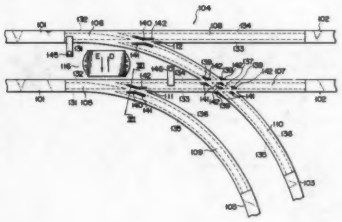
a magnetic unit provided on the carrier, said magnetic unit having at least a pair of yokes which have an air gap with respect to said guide rail means, and magnetic coils provided to said yokes, said yokes, said air gap, and said guide rail means constituting a magnetic circuit, and said carrier being adapted to be suspended from said guide rail means in a non-contact manner, by means of a magnetic attractive force acting between said magnetic unit and said guide rail means, so that the air gap of a predetermined size is maintained between the yokes and said guide rail means;

a coupling section for connecting the first to third rails to one another, said coupling section including a coupling rail formed of a ferromagnetic material and connecting the first to third rails to one another, said coupling rail formed of a ferromagnetic material and having a pair of first and second ridges respectively facing said yokes, and each of said ridges having a width substantially the same as that of each of said yokes in a traverse direction of the rail;

propelling means for providing a propelling force to said carrier so as to cause said carrier to travel along said guide rail means; and

transfer means provided at the coupling section, and adapted so that, at the coupling section, said carrier, having so far been running along the first rail, is transferred from the first rail to the coupling rail, and is then transferred to the second or third rail therefrom, all in a non-contact manner,

whereby when said carrier enters the coupling rail, magnetic



flux leakage from said yokes is concentrated on only said ridges without being biased to other portions, so that a force for preventing said magnetic unit from being shifted in a traverse direction of the rail with respect to said ridges is generated, and said carrier is reliably transferred from the first rail to either the second or third rail;

wherein the coupling rail consists of a first coupling rail, a second coupling rail, and a third coupling rail, one end of each of the first to third coupling rails is connected to corresponding one of the first to third rails, the other end of the first coupling rail is connected to the other end of each of the second and third coupling rails, and each of said first to third coupling rails has the first and second ridges;

wherein said coupling section has a rail joining section at which the first to third coupling rails are joined,

said rail joining section has a ridge intersection at which the first ridge of the second coupling rail intersects the second ridge of the third coupling rail, and

the ridge intersection has, on a side surface thereof, a projection formed of a ferromagnetic material,

whereby magnetic flux leakage from the yoke is flowed to both the ridge intersection and the projection, the yoke can be prevented from being attracted toward the ridge intersection, and swinging motion of said carrier can be prevented.

4,883,000

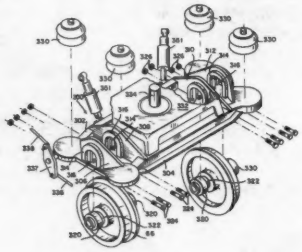
STUB AXLE TRUCK

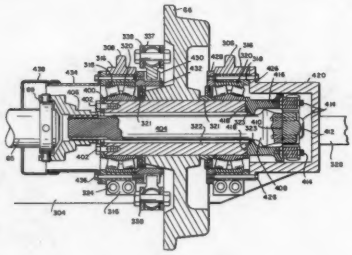
Thomas H. Engle, Cape Vincent, N.Y., assignor to General Signal Corp., Stamford, Conn.

Continuation-in-part of Ser. No. 776,764, Sep. 16, 1985, abandoned, and a continuation-in-part of Ser. No. 853,562, Apr. 18, 1986, Pat. No. 4,718,351. This application Nov. 5, 1987, Ser. No. 116,775

Int. Cl.[4] B61F *3/16*

U.S. Cl. 105—4.4 **15 Claims**





1. A stub axle truck comprising:

a frame;

a pair of wheels each being mounted to a hollow stub axle;

bearing means for rotatably mounting each end of said axles to said frame;

a sleeve extending through a respective axle and including a radial flange extending from each end of said sleeve adjacent an end of said axle for mounting said bearing means to said axle, one of said radial flanges being removably mounted to said sleeve; and

locking means interconnecting said sleeve and said axle for preventing rotational movement therebetween, said locking means including a plurality of axially extending and mating recess and lugs on an end of said axle and on said flange which is not removable.

4,883,001

PICNIC TABLE COVER

Alfred C. Roth, 2388 Yost Blvd., Ann Arbor, Mich. 48154

Filed Dec. 18, 1987, Ser. No. 135,008

Int. Cl.[4] A47B *13/08*

U.S. Cl. 108—90 **2 Claims**

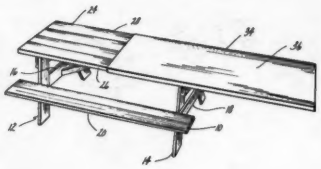
1. An outdoor picnic table comprising:

a plurality of elongated wooden planks arranged in edge-to-edge relationship to define a nominally flat, generally continuous top surface, parallel side edges, and transverse end edges;

protective cover means comprising a stiff, thin sheet of impervious plastic material having a face area commensurate with the area of said top surface, integral edge walls (**40, 42**) extending downwardly from opposite edges of said sheet for positionment in close proximity to edge areas of said top surface, and integral lip walls (**44, 46**) extending inwardly from said edge walls for positionment in close proximity to undersurface areas of said wooden planks at the parallel side edges;

said edge walls and lip walls being formed from the same plastic material as the stiff thin sheet, such that the cover means is a one-piece seamless structure;

said one-piece seamless structure having permanent bend lines where the edge walls are connected to the stiff sheet and lip walls, whereby the cover means can be slidably installed on the wooden planks to maintain a grip on said top surface in spite of wind forces tending to uncurl the lip



walls from engagement with the undersurface areas of said planks;

two sealing caps dimensioned to correspond to the shape of the surface of the plank end edges, said sealing caps being applied against the plank end edges to seal against entry of rain into the planks;

said caps having sealed connections with the thin sheet to prevent wind from getting between the sheet and the top surface of said planks;

at least one elongated spacer member insertable between an inner face of an edge wall (**40** or **42**) and a side edge of the wooden planks, to enable the cover means to maintain a firm stable position on the top surface in spite of tolerance variations in plank width dimensions; and

means for attaching the cover means and the end caps to the wooden planks in a permanently fixed position thereto.

4,883,002

FURNACE CLOSING MECHANISM FOR INDUSTRIAL FURNACES

Rolf Schuster, Hanau, Fed. Rep. of Germany, assignor to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,403

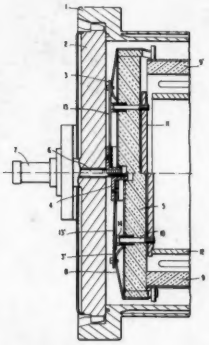
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 8714544[U]

Int. Cl.[4] F23M *7/00*

U.S. Cl. 110—173 R **4 Claims**

1. A furnace closing mechanism for attachment to industrial furnaces having a furnace shell and thermal insulation on the furnace interim, said closing mechanism comprising a furnace door that can be latched to the furnace shell and having an inner and an outer face, a heat-insulating door made of a thermal insulating material and attached to the inner face of the furnace door, which heat-insulating door seals in gastight manner with the thermal insulating of the furnace interior, the outer face of the heat-insulating door (**5**), having in contact therewith on the outer boundary, a plurality of leaf springs

(3,3') that are attached to and converge concentrically with a central threaded hub (4), the threaded hub being screwed onto



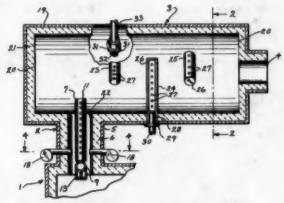
a threaded spindle (6) attached to the inner face of the furnace door (2).

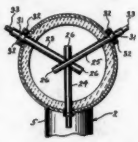
4,883,003

SECONDARY COMBUSTION CHAMBER FOR AN INCINERATOR

Gordon H. Hoskinson, 186 Mayfair Rd., Floral Park, N.Y. 11001

Filed Sep. 26, 1988, Ser. No. 249,333
Int. Cl.[4] F23G *7/06*
U.S. Cl. 110—212 **9 Claims**





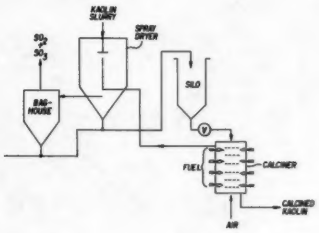
1. In an incinerator apparatus, an incinerator to burn waste material, a stack connected to the incinerator for discharging waste gases of combustion, a housing defining a secondary combustion chamber having an inlet connected to the upper end of said stack and having an outlet, at least one tube formed of ceramic material extending transversely of said chamber, said tube having an outer end connected to said housing and having a closed inner end, said tube extending more than one half the cross sectional dimension of said chamber, means for supplying air to the outer end of said tube, said tube having a plurality of outlet ports with the axes of said ports disposed generally normal to the flow of waste gases through said chamber, air introduced into said tube being discharged through said ports to provide an air curtain extending, generally transversely across said chamber.

4,883,004

METHOD FOR INHIBITING CORROSION IN INTEGRATED SPRAY DRYING-CALCINING PROCESS

Ove Hansen, Columbia, Md., assignor to Niro Atomizer Inc., Columbia, Md.

Filed Aug. 31, 1988, Ser. No. 238,422
Int. Cl.[4] F23J *1/00*
U.S. Cl. 110—343 **4 Claims**



1. A method for inhibiting spray drier and calciner corrosion in an integrated spray drying and calcining process in which the hot exit gas from the calciner are used to supply heat to the spray drier, which comprises passing a kaolin slurry to the spray drier, spray drying the kaolin slurry in the spray drier, passing the spray dried kaolin to the calciner, calcining the spray dried kaolin in the calciner, and passing the hot exit gases from the calciner to the spray drier, while maintaining said hot exit gases from the calciner at a temperature of 700°–800° C.

4,883,005

SEWING MACHINE WITH A TENSIONING DEVICE HAVING A PLURALITY OF TENSIONING ROLLERS

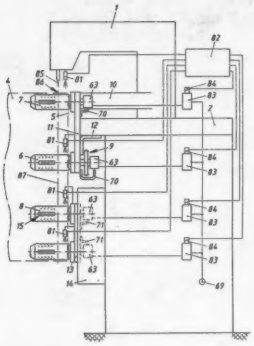
Bodo Wehmeyer, Bielefeld, Fed. Rep. of Germany, assignor to Durkoppwerke GmbH, Fed. Rep. of Germany

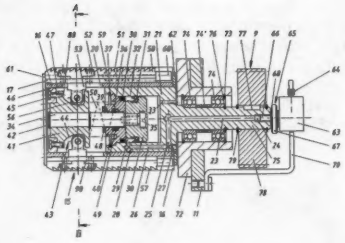
Filed Feb. 21, 1989, Ser. No. 313,099
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3805029
Int. Cl.[4] D05B *35/06, 35/10*
U.S. Cl. 112—63 **19 Claims**

1. A sewing machine having a tensioning device including a plurality of tensioning rollers disposed to receive and align tubular workpieces, and at least one sensor which is disposed to scan an edge of an opening of the workpiece; at least one tensioning roller having alignment members which are movable transverse to the direction of rotation thereof; said alignment members cooperating with said sensor and with a control unit for the automatically controlled alignment of the opening edge with respect to a sewing point;

wherein each tensioning roller has at least three alignment

members distributed about its periphery for engaging said workpieces, said alignment members being displaceable





both radially and axially with respect to the periphery of the tensioning roller.

4,883,006

AUTOMATIC SEWING MACHINE

Satoshi Marii, Nagoya; Kunihiko Murata, Tsushima, and Hiroyuki Mitsui, Kasugai, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Apr. 14, 1988, Ser. No. 181,531
Claims priority, application Japan, Apr. 24, 1987, 62-102755
Int. Cl.[4] D05B *21/00*
U.S. Cl. 112—121.12 **7 Claims**

1. An automatic sewing machine comprising:

a frame having a workpiece supporting surface thereon;

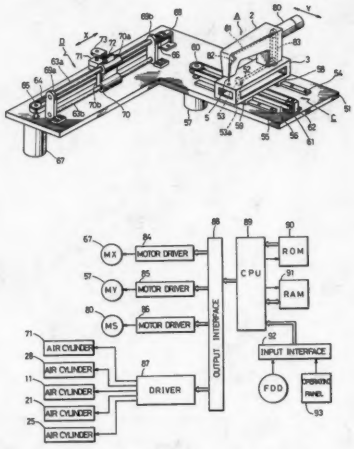
clamp means movably supported on said frame in a first predetermined direction for clamping a workpiece;

a clamp moving motor for moving said clamp means in said first direction;

a sewing head movably supported on said frame in a second direction intersecting said first direction and having a needle and a loop taker cooperating therewith;

a sewing head moving motor for continuously moving said sewing head in said second direction without a stoppage interval during reciprocal movement of said needle; and

control means for controlling said clamp moving motor and said sewing head moving motor to cause two-dimensional relative movement between said needle and said workpiece clamped by said clamp means and to form a two-dimensional stitch pattern.

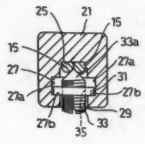


4,883,007

NEEDLE CLAMP FOR SEWING MACHINE

Nobusuke Nagasaka, Haguri, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Feb. 10, 1989, Ser. No. 308,444
Claims priority, application Japan, Mar. 1, 1988, 63-27064[U]
Int. Cl.[4] D05B *55/02*
U.S. Cl. 112—226 **8 Claims**



1. A needle clamp for attaching plural needles to a needle bar of a sewing machine, comprising:

a clamp body secured to a lower end portion of said needle bar and having a first hole for receiving said plural needles in side-by-side relationship in a first direction within a predetermined plane and a second hole communicating with said first hole in a second direction substantially perpendicular to said predetermined plane;

a clamp screw positioned within said second hole and having a threaded shaft portion and a conical end portion engageable with peripheral surfaces of two adjacent needles of said plural needles, a diameter of said threaded shaft portion being smaller than a dimension of said second hole in said first direction so that said clamp screw moves in said first direction;

a nut member threaded to engage with said threaded shaft portion of said clamp screw and disposed in said clamp body so as to move in said first direction;

means for preventing said nut member from rotating about an axis of said clamp screw; and

means for preventing said nut member from moving in said second direction away from said plural needles received in said first hole.

4,883,008

METHOD OF AND APPARATUS FOR CONTROLLING SEWING RATE IN SEWING MACHINE

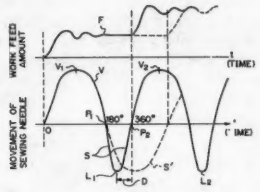
Tohru Hiramatsu, Tokyo, Japan, assignor to Juki Corporation, Tokyo, Japan

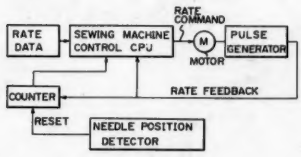
Filed Oct. 27, 1988, Ser. No. 263,531

Claims priority, application Japan, Oct. 30, 1987, 62-275413

Int. Cl.[4] D05B *69/18*

U.S. Cl. 112—262.1 **5 Claims**





1. In a method of controlling the sewing rate in a sewing machine comprising a reciprocally and vertically movable needle, a motor for driving said needle and a throat plate on which a workpiece is adapted to be placed having a needle hole through which said needle moves, said sewing machine being adapted to repeatedly perform a cycle wherein the needle moves downwardly from the upper dead center to the bottom dead center passing through said needle hole and then upwardly from the bottom dead center to the upper dead center passing through the needle hole, the improvement wherein while said needle is below said throat plate the needle is moved at a rate higher than that at which the needle is moved while the needle is above the throat plate.

4,883,009

METHOD OF AND APPARATUS FOR PROCESSING TEXTILE MATERIAL WEBS, ESPECIALLY FOR THE MANUFACTURE OF QUILTS AND THE LIKE

Franz Haselberger, Hard, Austria, and Peter Vogel, Platz-Walzenhausen, Switzerland, assignors to Fritz Gegauf AG, Steckborn, Switzerland

Filed Oct. 3, 1988, Ser. No. 252,601

Claims priority, application Switzerland, Oct. 6, 1987, 3919/87

Int. Cl.[4] D05B *21/00, 11/00;* D05C *3/00*

U.S. Cl. 112—266.1 **9 Claims**

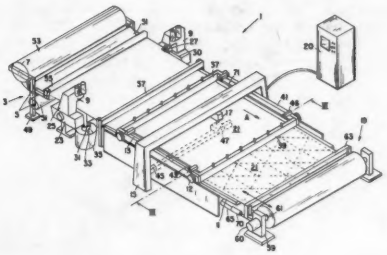
1. A method of processing textile material webs, especially for the manufacture of quilts and the like in a quilting machine, comprising the steps of:

clamping the textile material webs by means of a first clamping device disposed upstream of a tenter frame and a second clamping device disposed downstream of the tenter frame; for processing a workpiece;

stretching the textile material webs between the first clamping device and the second clamping device;

clamping the textile material webs by means of toothed segments which are laterally arranged at the tenter frame;

stretching the textile material webs in a transverse direction relative to a predetermined direction of travel of the textile material webs by shifting first tenter means so as to rest against a stop, thus positioning the workpiece, holding the workpiece under tension by second tenter means, and subsequently closing clamping devices disposed at rear and front ends of the tenter frame and extending transversely relative to the now stretched workpiece;



releasing the first clamping device disposed upstream of the tenter frame;

guiding the tenter frame with the stretched workpiece to be processed towards a receiving end of the quilting machine and simultaneously withdrawing new cover material webs and at least one filler material web from a feed station;

joining marginal portions of the textile material webs during the step of withdrawing the new cover material webs and the at least one filler material web;

quilting the workpiece stretched in the tenter frame by means of a sewing device, thus a quilted workpiece;

said step of quilting comprising moving the tenter frame and the sewing device relative to one another; and

guiding the quilted workpiece out of the quilting machine.

4,883,010

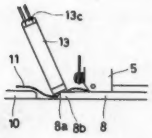
THREAD CHAIN CUTTING DEVICE

Takeshi Matsumoto, Osaka, Japan, assignor to Yamato Mishin Seizo Kabushiki Kaisha, Osaka, Japan

Filed May 16, 1988, Ser. No. 194,263

Int. Cl.[4] D05B *65/00*

U.S. Cl. 112—288 **1 Claim**



1. A thread chain cutting device for use in a sewing machine which produces a thread chain, comprising:

an upper knife having a bottom surface in the shape of a flat plane;

a machine arm having a driving mechanism on which said upper knife is mounted for movement up and down in a direction substantially transverse to said flat plane, said

driving mechanism being operable elevating and lowering said upper knife; and

a lower knife having an obtuse angled cutting edge and being fixed in position beneath said upper knife for having said bottom surface of said upper knife engage said cutting edge during the lowering of said upper knife, whereby if said driving mechanism is accidentally actuated while fabric or an operators finger or the like is beneath said upper knife, there is no risk of cutting the fabric or the operator's finger.

4,883,011

HYDROFOIL KEEL

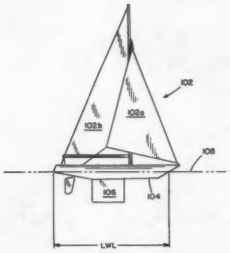
Merrick L. Sims, 7 Ilya Avenue, Bayview, New South Wales 2103, Australia

Continuation-in-part of Ser. No. 647,140, Sep. 4, 1984, abandoned. This application Jan. 27, 1987, Ser. No. 9,646

Claims priority, application Australia, Sep. 5, 1983, PG1210; Sep. 5, 1983, PG1211; Sep. 19, 1983, PG1459; Dec. 5, 1983, PG2681; Jan. 2, 1984, PG3415; Jul. 26, 1984, PG6226

Int. Cl.[4] B63B *3/38*

U.S. Cl. 114—39.1 **14 Claims**



1. In a high performance sailing boat having a sail rig designed to operate in a range of wind speeds up to an upper designed wind speed and a displacement hull with a hull speed being the maximum theoretical speed of the hull when heating, a keel having hydrofoil shape and a lifting surface area aproximately equal to the sail area of the sail rig multiplied by the square of the ratio of the upper designed wind speed to the hull speed, and further multiplied by the ratio of the lift coefficient of the sail rig at its setting giving the highest lift/drag ratio at the upper designed wind speed to the lift coefficient of the keel at the angle of attack giving its highest lift/drag ratio all divided by 800.

4,883,012

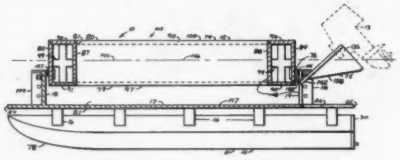
DUAL-PURPOSE WATER CRAFT

George D. Kennedy, Rte. 2, Box 109-B, Reliance, Tenn. 37369

Filed Sep. 30, 1988, Ser. No. 253,192

Int. Cl.[4] B63B *1/10, 3/08*

U.S. Cl. 114—61 **8 Claims**



1. A water craft adapted and arranged to float on the surface of a water body comprising:

(a) a first floatable structure having a deck,

(b) controllable means connected with the first floatable structure and controllable to vertically move the first floatable structure between a first position at which said deck is located above the surface of the water and a second position at which said deck is submerged below the surface of the water,

(c) a second floatable structure which is moveable relative to the first floatable structure and has a floatable section with a vertical opening that overlies said deck and which is supported by said first floatable structure when said first floatable structure is at said first position therefor, and

(d) means mounted on the second floatable structure for propelling the craft through the water;

said second structure being arranged to float on the water surface when said first structure is at said second position and to thereat define the surface area of a swimming pool within said vertical opening,

said deck being arranged to provide a bottom portion of the swimming pool when said first structure is at said second position and to provide a passenger area when said first structure is at said first position, and

said first and second structures being arranged to cooperate in providing side wall portions of said swimming pool when said first structure is at said second position.

4,883,013

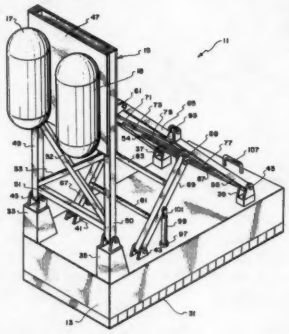
PORTABLE, RAPID INSTALLABLE DOLPHIN SYSTEM

Sheng S. Lin, Camarillo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 1, 1989, Ser. No. 345,339

Int. Cl.[4] E02B *3/22*

U.S. Cl. 114—219 **14 Claims**



1. A portable rapidly installable dolphin system for absorbing forces of impact from a moored floating vessel comprising:

a. a hollow rectangular shaped gravity base having an upper and bottom surface;

b. a skirt having an upper surface attached to the bottom surface of said gravity base;

c. a rectangular shaped plate having a front and a back surface and a pair of vertical legs extending from the bottom edge thereof, each of said legs being connected in rotational engagement to the upper surface of said gravity base near the front end thereof;

d. means mounted on the front surface of said plate for absorbing forces of impact from said moored floating vessel;

e. a plate support structure having one end thereof connected in rotational engagement to the back surface of said plate and the opposite end thereof connected in rotational engagement to the upper surface of said gravity base near the rear end thereof;

f. actuating means mounted within the upper surface of said gravity base, said actuating means having a drive member connected in rotational engagement to said plate support structure near the center thereof; and

g. said actuating means adapted to effectuate the movement of said plate support structure so as to raise said plate from a first position which is above and approximately parallel to the upper surface of said gravity base to a second position which is above and approximately perpendicular to the upper surface of said gravity base.

4,883,014

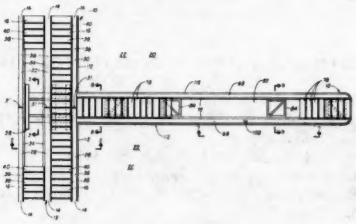
MARINA

Roger W. Otis, 308 Bluebird Dr., and Stephen H. Otis, Rte. 2, both of McAlester, Okla. 74501

Continuation of Ser. No. 925,726, Oct. 31, 1986, abandoned. This application Jan. 24, 1989, Ser. No. 302,099

Int. Cl.[4] B63B *35/72*

U.S. Cl. 114—263 **12 Claims**



1. A marina comprising a main walk, at least one finger walk fixedly connected thereto and angularly disposed therefrom, and floatation means for buoyantly supporting the main walk and finger walk above a body of water;

a unitary structure consisting of a plurality of spaced parallel elongate main frame plates, and a plurality of spaced parallel elongate finger frame plates in underlying relationship with the main frame plates and angularly displaced therefrom;

the main walk comprising a plurality of elongate main frame members each engaging a corresponding main frame plate;

the finger walk comprising a plurality of elongate finger frame members each engaging a corresponding finger frame plate;

means for securing each main frame plate to its corresponding spaced main frame member and in parallel relationship thereto;

means for securing each finger frame plate to its corresponding spaced finger frame member and in parallel relationship thereto;

at least one main walk surface surported by at least two of the main frame members; and at least one finger walk surface surported by at least two finger frame members.

4,883,015

END PLATE FOR A RAM-WING BOAT

Günther W. Jörg, Odenwaldring 24, 6101, Gross-Bieberau, FRG, Fed. Rep. of Germany

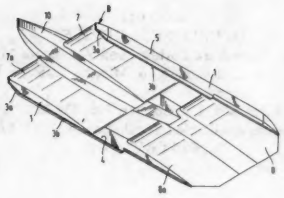
Filed Jul. 8, 1988, Ser. No. 216,603

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1987, 3723487

Int. Cl.[4] B63B *1/16*

U.S. Cl. 114—272 **6 Claims**

1. An end plate for a ram-wing boat, the ram-wing boat having a hull and two airfoils in the form of ailettes disposed on each side of the hull, said end plate being connected to an outer surface of the two airfoils located on one side of the hull and comprising an upper chord, a lower chord, inner and outer flat side plankings which connect together the upper and lower chords, said upper and lower chords and inner and outer plankings together defining a substantially hollow body having a longitudinal axis, and a plurality of ribs spaced along the longitudinal axis within said hollow body, said ribs being perpendic-



ular to said longitudinal axis, wherein said inner planking is connected to the two airfoils and said upper and lower chords each includes a surface at an acute with respect to the inner planking so that said end plate is essentially trapzoidal in cross section.

4,883,016

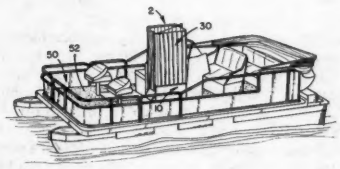
COLLAPSIBLE MARINE PRIVACY CHAMBER

Thomas A. Larson, 1217 Phelps St., Red Wing, Minn. 55066

Filed May 20, 1988, Ser. No. 196,981

Int. Cl.[4] B63B *17/00*

U.S. Cl. 114—363 **18 Claims**



1. A privacy chamber, comprising:

(a) an openable enclosure having an openable top;

(b) a sectional support member including a plurality of elongated cooperating segments, wherein the cooperating segments can cooperate to form the sectional support member, said cooperating segments having male and female ends such that the cooperating segments can be assembled by inserting one into another in an end-to-end relationship;

(c) means for anchoring said sectional support member inside of said openable enclosure, said anchoring means cooperating with said cooperating segments such that the cooperating segments cooperate with said anchoring means such that the support member can extend vertically from the openable enclosure when said enclosure is open;

(d) an upper support frame attachable to an upper portion of said support member;

(e) a flexible sheet attachable to the upper support frame such that the flexible sheet can hang from the upper support frame thereby providing a partial enclosure such that one can obtain a measure of privacy, said flexible sheet being a curtain which can be drawn substantially around an individual to form said partial enclosure such that the image of the individual inside is not clearly visible to a person outside;

(f) a lower support frame, said flexible sheet being attached to said lower support frame, said lower support frame

being attached to inside walls of said openable enclosure; and

(g) upper support means for supporting said upper support frame such that said upper support frame can support the flexible sheet when the sheet is attached to the upper support frame.

4,883,017

DEVELOPING DEVICE

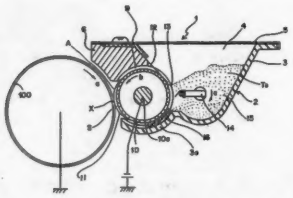
Enoguchi Yuji; Natsuhara Toshiya, and Yamamoto Masashi, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 1, 1988, Ser. No. 239,224

Claims priority, application Japan, Sep. 4, 1987, 62-222587

Int. Cl.[4] G03G *15/08*

U.S. Cl. 118—653 **11 Claims**



1. A developing device disposed adjacently to a rotatably arranged electrostatic latent image support member, which comprises:

a rotatably disposed developing roller confronting said electrostatic latent image support member;

a cylindrically formed flexible filmy member having a peripheral length being slightly longer than that of said developing roller and loosely mounted therearound;

first means for bringing said filmy member partly into close contact with said developing roller so as to protrude an extra peripheral length portion of said filmy member toward said developing roller so that said extra portion of an external peripheral surface of said filmy member may be brought into contact with said electrostatic latent image support member; and

second means for forming a thin layer of charged toner on the external surface of said filmy member brought into contact with said developing roller, dimensions and a physical property of said filmy member being satisfied with following equations:

$$0.05 \leqq E \cdot t^3 \leqq 10;$$

$$2.5 \leqq R \leqq 50;$$

wherein, E (kg/mm^2) is a modulus of longitudinal elasticity and t (mm) is a thickness and R (mm) is a radius.

4,883,018

LIQUID INK DEVELOPMENT SYSTEM

Oded Sagiv, Rehovot, Israel, assignor to Xerox Corporation, Stamford, Conn.

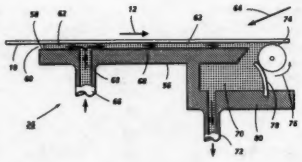
Filed Oct. 28, 1988, Ser. No. 263,941

Int. Cl.[4] G03G *13/10*

U.S. Cl. 118—660 **33 Claims**

1. An apparatus for developing with a liquid developer material a latent image recorded on a generally planar member moving in a direction at least partially opposed to the direction of the gravitational force exerted thereon, including:

means, defining an extended development zone substantially parallel to the generally planar member, for developing the latent image recorded on the planar member, said developing means cooperating with the generally planar member to pump the liquid developer material in at least a partially upwardly direction from the lowermost region of the development zone to the uppermost region thereof to form a pressure barrier preventing the escape of liquid



developer material from the lowermost region of the development zone; and

means for sealing the uppermost region of the development zone to prevent the escape of liquid developer material thereat.

4,883,019

IMAGE FORMING APPARATUS HAVING DEVELOPER CONTENT DETECTOR

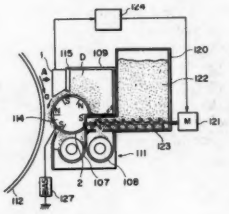
Takeshi Menjo, Tokyo; Masahiro Inoue, Yokohama, and Koji Amemiya, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 19, 1988, Ser. No. 145,815

Claims priority, application Japan, Jan. 19, 1987, 62-009432; Jan. 19, 1987, 62-009433; Jan. 19, 1987, 62-009435; Jan. 19, 1987, 62-009436

Int. Cl.[4] G03G *15/08;* B05C *11/00*

U.S. Cl. 118—691 **17 Claims**



1. An image forming apparatus, comprising:

an image bearing member;

developing means for developing a latent image formed on said image bearing member, containing a two component developer containing toner and carrier and including a developer carrying member for carrying the developer toward said image bearing member;

a toner content detecting means including a reflecting member for receiving light and reflecting a quantity of light corresponding to a reference toner content, a light emitting element for applying light to the reflecting member and to the developer carrying member and a light receiving element for receiving the light reflected by the developer carried on said developer carrying member and the light reflected by the reflecting member to produce an electric signal in accordance with a quantity of light received thereby; and

toner content control means for controlling toner supply to said developing means in accordance with a signal produced by said toner content detecting means;

said toner content control means including:

means for storing a ratio of a reference toner content signal from the light receiving element corresponding to a quan-

tity of light from the developer at an initial reference toner content state to a reference reflection density signal from the light receiving element corresponding to a quantity of light reflected by said reflecting member, as an initial reference ratio signal; and

toner supply control means for producing a ratio signal representative of a ratio of a toner content signal from the light receiving element corresponding to a quantity of light reflected by the developer upon toner content detection to a reflection density signal from said light receiving element corresponding to a quantity of light reflected by said reflecting member, and for comparing the ratio signals, and for controlling toner supply to said developing means on the basis of a result of the comparison.

4,883,020

APPARATUS OF METAL ORGANIC CHEMICAL VAPOR DEPOSITION FOR GROWING EPITAXIAL LAYER OF COMPOUND SEMICONDUCTOR

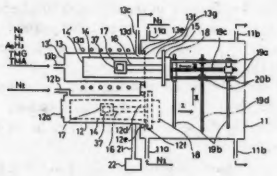
Kazumi Kasai, Atsugi; Hiromi Itoh, Kawasaki; Hitoshi Tanaka; Tatsuya Oh-hori, both of Sagamihara, and Junji Komeno, Fujisawa, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 887,339, Jul. 21, 1986, abandoned. This application Mar. 8, 1989, Ser. No. 320,922

Claims priority, application Japan, Jul. 19, 1985, 60-159849

Int. Cl.[4] C23C *16/00*

U.S. Cl. 118—719 **23 Claims**



1. Apparatus of metal organic chemical vapor deposition for growing an epitaxial layer of compound semiconductor on a semiconductor wafer, comprising:

support means for supporting the wafer, including:

a susceptor receiving the wafer;

a connecting rod, having first and second ends, the first end being connected to said susceptor; and

a lid connected to the second end of said connecting rod;

a reaction chamber effecting said MOCVD process therein including:

a first gas inlet introducing gases for MOCVD processing into said reaction chamber; and

a first gas outlet draining said gases;

load lock chamber means for loading and unloading the wafer into and from said reaction chamber, respectively, said load lock chamber means including;

a second gas inlet allowing introduction of an inert gas into said load lock chamber means,

a second gas outlet allowing evacuation of said load lock chamber means;

an evacuation pump evacuating said load lock chamber means through said second gas outlet; and

a doorway through which said wafer is input or output, said doorway being vacuum-sealable; and

a transfer chamber provided between said reaction chamber and said load lock chamber means and including:

a third gas inlet allowing introduction of an inert gas into said transfer chamber;

a third gas outlet allowing drainage of the inert gas from said transfer chamber so that said transfer chamber is continuously replenished by the inert gas introduced through said third gas inlet and drained through said third gas outlet;

a first opening connecting said transfer chamber to said load lock chamber means, through which said wafer is input to or output from said transfer chamber and being vacuum-sealable by said lid;

a second opening connecting said transfer chamber to said reaction chamber, through which said wafer is input to or output from said reaction chamber and being vacuum-sealable; and

transfer means for transferring said supporting means from said load lock chamber into said reaction chamber and from said reaction chamber into said load lock chamber, said transfer chamber being fed and filled with an inert gas, preventing the invasion of foreign gas from the outside into said reaction chamber.

4,883,021

ABSORBENT COMPOSITION

Cyril L. Ducharme, Long Lake; Ralph C. Eickhof, Erskine; David A. Heider, St. Paul; Denny W. Neiberger, Minnetonka, all of Minn., and Fred Maass, Oak Park, Ill., assignors to Personal Pet Products Partnership, Minneapolis, Minn.

Continuation-in-part of Ser. No. 909,966, Sep. 22, 1986, Pat. No. 4,727,824. This application Feb. 19, 1988, Ser. No. 157,915

The portion of the term of this patent subsequent to Mar. 3, 2005, has been disclaimed.

Int. Cl.[4] A01K *1/015*

U.S. Cl. 119—1 **16 Claims**

1. An absorbent composition comprising

(i) a major amount of a cellulosic component,

(ii) a minor amount of about 2–25% by weight of a binder based on the total weight of cellulosic material and binder, and

(iii) a nitrogenous compound absorber, said binder consisting essentially of a material selected from the group consisting of carbohydrate, protein and mixtures thereof; said cellulosic component comprising:

(a) from 50–100% by weight of a cellulosic hull material selected from the group consisting of cereal grain hulls, peanut hulls, soybean, rapeseed, sunflower and cottonseed hulls, and mixtures thereof and

(b) up to 50% by weight of plant pulp; said nitrogenous compound absorber being selected from the group consisting of polymerized cyclodextrin, cyclodextrin derivatives and polyacrylate compounds having a matrix system similar to cyclodextrin.

4,883,022

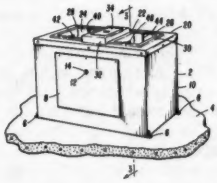
ANIMAL WATERER

B. A. Barker, 339 South Cedar, Monticello, Iowa 52310

Filed May 9, 1988, Ser. No. 192,417

Int. Cl.[4] A01K *7/00*

U.S. Cl. 119—73 **24 Claims**



1. Apparatus for watering animals, the invention comprising

a container to hold water,

a cover overlying said container,

said cover having at least one polygonal basin depending downward therefrom,

said basin having at least one port in a wall thereof,

said basin being open at its intersection with said cover,

said basin communicating at its interior with water contained within said container,

a float positioned within said basin,
said float being sufficiently buoyant to float upon water contained within said basin,
said float slideably engaging at least one guide member mounted to said basin,
said guide member being generally vertically disposed within said basin,
said float substantially covering the water positioned within said basin,

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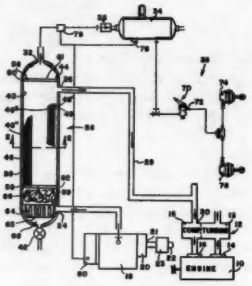
4,883,023

POLYMERIC MEMBRANE AIR SEPARATOR FOR A TURBOCHARGER AND BRAKE SYSTEM IN A VEHICLE

Peter Tsang, Union Lake; Seong Rhee, Northville; Michael Jacko, Southfield, all of Mich., and James Kubik, Avon Lake, Ohio, assignors to Allied-Signal Inc., Morristown, N.J.

Filed Dec. 14, 1988, Ser. No. 284,266
Int. Cl.[4] F02D *19/00*
U.S. Cl. 123—25 A 15 Claims



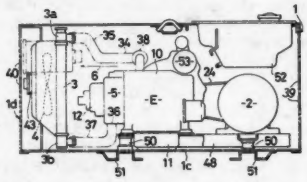
1. In a vehicle having a turbocharger for supplying an engine with pressurized air and a storage reservoir for supplying a brake system with pressurized dry nitrogen enriched air through the operation of an air compressor, the improvement comprising:
a housing having a chamber with an inlet port connected to receive pressurized air from said air compressor, a first outlet port connected to said turbocharger and a second outlet port connected to said storage reservoir;
a polymeric fiber membrane located in said chamber, said fiber membrane having a bundle of tubular members, each tubular member having a first end and a second end; and
mounting means that engage said housing and the first and second ends of each tubular member in said bundle to define a sealed barrier between said inlet port and first outlet port and said first and second outlet ports, said pressurized air being presented to said inlet port and flowing through said tubular members from said first end toward said second end, said polymeric fiber membrane having an affinity for oxygen and water such that oxygen and water permeate through said polymeric membrane to create moist oxygen enriched pressurized air which flows from said first outlet port while dry nitrogen enriched pressurized air flows from said second end of said tubular members to said second outlet port for distribution to said storage reservoir, said moist oxygen enriched pressurized air being combined with the pressurized air from the turbocharger to enhance combustion of fuel in the engine, said dry nitrogen enriched pressurized air presented to said brake system reducing the possibility of corrosion of the components within the brake system.

4,883,024

WATER-COOLING SYSTEM FOR A WATER-COOLED HORIZONTAL CYLINDER ENGINE

Ryoichi Ito; Koji Iwai; Tsuyoshi Nishida, and Junji Kimura, all of Sakaishi, Japan, assignors to Kubota Limited, Osaka, Japan

Filed Dec. 30, 1987, Ser. No. 139,753
Claims priority, application Japan, Jan. 23, 1987, 62-15001
Int. Cl.[4] F01P *1/02*
U.S. Cl. 123—41.7 9 Claims



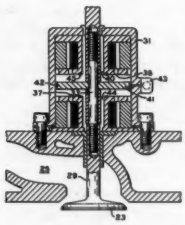
1. A water-cooling system for a water-cooled horizontal cylinder engine, comprising:
(a) a cylinder head arranged foreside of a cylinder block of a water-cooled horizontal cylinder engine;
(b) a radiator, having an inlet and an outlet, mounted in a space foreside of the cylinder head so as to face forward of said engine;
(c) a water jacket formed in the cylinder head and the cylinder block and having inlet and outlet ports;
(d) a hot water pipe connecting the outlet port of the water jacket to the water inlet of the radiator;
(e) a cold water pipe connecting the water outlet of the radiator to the inlet port of the water jacket;
(f) a radiator fan disposed against the radiator to flow air therethrough; and
(g) a cooling air passage through which cooling air is forced to pass at least from the space over the cylinder head to the radiator by operation of the radiator fan.

4,883,025

POTENTIAL-MAGNETIC ENERGY DRIVEN VALVE MECHANISM

William E. Richeson, Jr., Fort Wayne, Ind., assignor to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Feb. 8, 1988, Ser. No. 153,262
Int. Cl.[4] F01L *9/06*
U.S. Cl. 123—90.11 3 Claims



1. An electronically controllable valve mechanism for use in an internal combustion engine comprising:
an engine valve having an elongated valve stem;
motive means comprising a housing, a piston coupled to the valve and air compressed by the piston within the housing for causing the valves to move in the direction of stem

elongation between valve-open and valve-closed positions;

magnetic latching means including said piston for holding the valve in each of the valve-open and valve-closed positions; and

means for releasing the magnetic latching means allowing the motive means to move the valve.

4,883,026

MEANS FOR ADJUSTING THE TIMING OF A VALVE

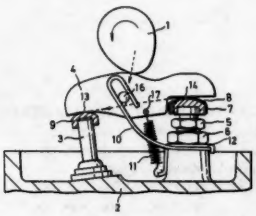
Wilfred P. Mansfield, late of Eastleigh; Jill Mansfield, Poole; John R. Mansfield, Kingswood, and Jeremy H. Grice, Southampton, all of United Kingdom, assignors to British Internal Combustion Engine Research Institute, Ltd., United Kingdom

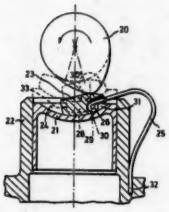
Filed Apr. 6, 1988, Ser. No. 178,150

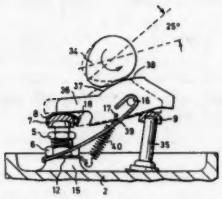
Claims priority, application United Kingdom, Apr. 7, 1987, 8708210; Jul. 17, 1987, 8716862

Int. Cl.[4] F01L *1/18*

U.S. Cl. 123—90.16 **19 Claims**







1. Apparatus for adjusting the timing of a valve mechanism, said apparatus comprising:

a cam rotatable about an axis of rotation;

a cam follower arranged to actuate a valve mechanism in response to the rotation of said cam and moveable in translation relative to said axis of rotation of said cam and in lateral translation relative to the direction of actuation of said valve mechanism to vary the extent of actuation, said cam follower having a cam following surface engaged by said cam and a valve actuation surface engaging said valve mechanism, said cam following and valve actuation surfaces providing different extents of actuation, of the valve mechanism for a given cam position, for different translational positions of said cam follower and wherein said cam follower surface is shaped so that for a part of the cycle of rotation of said cam, the force generated by said cam on said cam follower urges said cam follower to move in said lateral translation relative to the direction of actuation of said valve mechanism.

4,883,027

VALVE OPERATING SYSTEM FOR INTERNAL COMBUSTION ENGINES

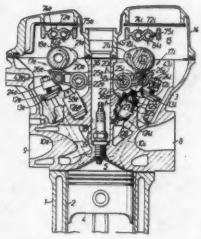
Toshihiro Oikawa; Tsuneo Tanai; Noriyuki Yamada; Tsutomu Saka, and Toshiki Kobayashi, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

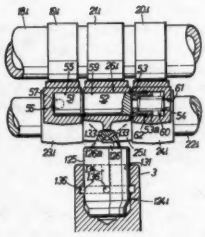
Filed Nov. 23, 1988, Ser. No. 276,403

Claims priority, application Japan, Nov. 25, 1987, 62-178966; Oct. 11, 1988, 63-132442; Oct. 11, 1988, 63-132443; Nov. 7, 1988, 63-145108

Int. Cl.[4] F01L *1/34;* F01M *9/10*

U.S. Cl. 123—90.16 **16 Claims**





1. A valve operating system for internal combustion engines, comprising a drive cam follower operatively connected to an engine valve, a free cam follower capable of operation independent of said drive cam follower, said cam followers being adjacently disposed for operation in mutually different modes in response to rotation of a cam shaft, a connection change-over mechanism provided between said cam followers and capable of changing-over connection and disconnection between the followers, and resilient biasing means provided between said free cam follower and an engine body for resiliently urging said free cam follower toward said cam shaft, wherein said resilient biasing means comprises an urging piston slidably received in the engine body for abutment against the free cam follower, and a spring interposed between the urging piston and the engine body to resiliently bias the urging piston in a direction to abut against the free cam follower, the urging piston being provided at an end of the free cam follower in

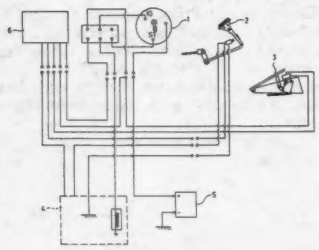
close proximity to the pivot end thereof, with an abutment having a smaller diameter to abut against the free cam follower.

4,883,028

FOOT CONTROLLING ENGINE START, STOP AND BRAKE SYSTEM

Gerald P. Wu, Hsinchu, Taiwan, assignor to Wu's Agriculture Machinery Mfg. Co., Ltd., Hsinchu, Taiwan, Taiwan

Filed Apr. 5, 1988, Ser. No. 177,996
Int. Cl.[4] F02N *11/08*
U.S. Cl. 123—179 B **2 Claims**



1. A brake pedal activated engine controlling means comprising:
- a control circuit associated with an ignition switch;
- a starter motor;
- a brake;
- an accelerator;
- and a generator for controlling the automatic stopping of said starter motor by feeding back the output voltage of said generator, said control circuit comprising an automatic and manual switch for automatically or manually controlling said starter motor and said engine;
- a regulator for providing a regulated voltage by means of an IC1;
- a trigger having an IC2 for effecting discharge-triggering by means of a first transistor and rendering an IC3 providing a first desirable voltage to control activation of said starter motor and, in turn, said engine, so that said generator outputs a second desirable voltage to said IC2 to make a second transistor non-conductive and therefore said starter motor cannot be activated by pushing said accelerator when said engine is in operation;
- a timer for automatically stopping said starter motor within 3 seconds from triggering;
- a feedback controller having a plurality of ICs for stopping said starter motor when said engine is shown by said second voltage picked up from said generator to be running; and
- a stop circuit for grounding a stop wire, said stop circuit being activated by the application of pressure on said brake pedal so as to stop said engine and cut off power to said ICs.

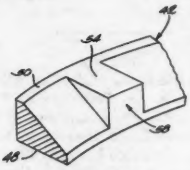
4,883,029

PISTON AND PISTON RING CONSTRUCTION

John H. Winston, Menomonee Falls, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Apr. 7, 1987, Ser. No. 35,596
Int. Cl.[4] F16J *9/20, 9/24;* F02F *5/00*
U.S. Cl. 123—193 P **10 Claims**

5. A piston assembly comprising a piston reciprocally movable along an axis and including a generally cylindrical outer surface having therein a circumferentially extending groove, said groove being partially defined by a surface extending transversely to said axis and having therein a recess extending axially of said piston, and a piston ring located in said groove and including a first arcuate segment having upper and lower radially extending surfaces which radially outwardly diverge and having an inner periphery with an axial thickness, and a



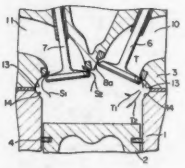
second arcuate segment connected to said first segment, extending into said recess and having an inner periphery with an axial thickness, said axial thickness of said second segment being greater than said axial thickness of said first segment.

4,883,030

COMBUSTION CHAMBER OF A TWO-STROKE ENGINE

Toshio Tanahashi; Masanobu Kanamaru; Toshio Itoh, and Kazuhiro Itoh, all of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Nov. 4, 1988, Ser. No. 267,272
Claims priority, application Japan, Nov. 26, 1987, 62-295981; Nov. 26, 1987, 62-295982
Int. Cl.[4] F02B *19/04*
U.S. Cl. 123—193 CH **19 Claims**



1. A two-stroke engine comprising:
- a cylinder block having therein a cylinder bore having an inner wall with a top portion and a lower portion;
- a cylinder head having an inner wall;
- a piston reciprocally movable in said cylinder bore, the inner wall of said cylinder head and a top face of said piston defining a combustion chamber therebetween;
- at least one intake valve arranged on the inner wall of said cylinder head;
- at least one exhaust valve arranged on the inner wall of said cylinder head;
- the inner wall of said cylinder head having a peripheral cut away portion which extends radially beyond an extension of the lower portion of the inner wall of said cylinder bore at a position at least around said intake valve, the top portion of the inner wall of said cylinder having a peripheral cut away portion radially extending beyond the extension of the lower portion of the inner wall of said cylinder bore at a position at least around said intake valve; and
- masking means arranged between said intake valve and said exhaust valve to mask a valve opening formed between a valve seat and a peripheral portion of said intake valve, which is located on said exhaust valve side, for the entire time for which said intake valve is open.

4,883,031
INTERNAL COMBUSTION ENGINE

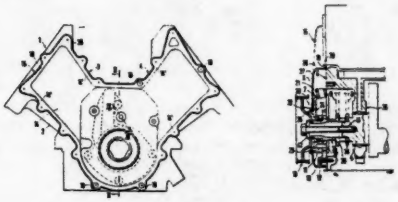
Herbert Ampferer, Sachsenheim, and Klaus Groeger, Hemmingen, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Weissach, Fed. Rep. of Germany

Filed Aug. 9, 1988, Ser. No. 230,019

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1987, 3728268

Int. Cl.[4] F02B *77/00*

U.S. Cl. 123—195 C **25 Claims**



1. An internal combustion engine comprising cylinder means and a crankshaft rotatably supported in a crankcase which adjacent an end face of the crankcase is constructed for the drive of at least one of auxiliary aggregates and endless elements housed in an accessory housing secured at the end face of the crankcase, cover means at least partly covering the at least one of auxiliary aggregates and endless members, said cover means extending at least over a partial area of the end face of the crankcase and being detachable, the cover means being a sheet metal part including at least two relatively thin-walled layers which contact one another and having a pot-shaped cross section, said cover means being secured at the end face of the crankcase by means of a circumferential edge flange and by means of bolts, and the cover means being supported with a section of a convexly curved base wall of the cover means at the housing by a sealing member.

4,883,032
IN-CYLINDER CONTROL OF PARTICULATES AND NITRIC OXIDE FOR DIESEL ENGINE

Charles E. Hunter, Belleville, and Harry A. Cikanek, Northville, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 23, 1989, Ser. No. 299,853

Int. Cl.[4] F02B *3/00*

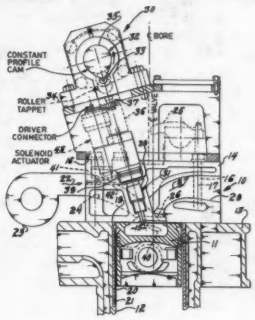
U.S. Cl. 123—276 **12 Claims**

1. A method of providing simultaneous and concurrent in-cylinder control of the formation of particulates and nitric oxide during the combustion cycle of direct-injected diesel fuel and pressure charged air in a combustion chamber of a heavy duty diesel engine, the combustion chamber being (i) defined in part by a piston crown separated by a supply of lubricating oil by piston rings and (ii) employing accepted advanced combustion techniques for introducing, distributing and compressing said fuel and air comprising the steps of:

(a) injecting said diesel fuel at a pressure equal to or greater than 16×10^3 psi through injector ports having a diameter of less than 0.22 mm;

(b) retarding the start of fuel injection from TDC by 2°–5°, and

(c) limiting ingress of lubricating oil into said combustion chamber by increasing the piston ring to cylinder bore



concentricity through the use of noncompressed cylinder sleeves defining said cylinder bore.

4,883,033
IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

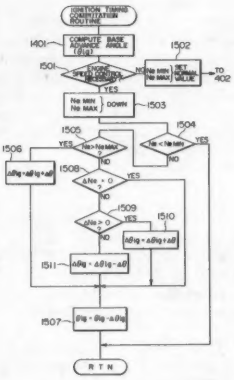
Katsuharu Hosoe; Teruyoshi Itoh, both of Kariya; Ryosuke Tachi, Aichi, and Takao Nojiri, Chiryu, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed May 3, 1988, Ser. No. 189,824

Claims priority, application Japan, May 13, 1987, 62-116432; May 28, 1987, 62-132683

Int. Cl.[4] F02P *5/145*

U.S. Cl. 123—335 **17 Claims**



1. An ignition timing control system for an internal combustion engine for controlling ignition timing electronically in accordance with operating conditions of the internal combustion engines, comprising:

means for stopping an ignition operation;

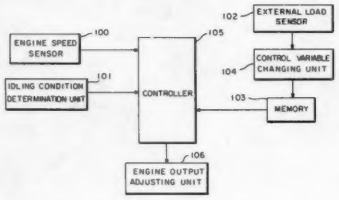
means for retarding an ignition timing; and

engine speed-responsive control means for controlling said ignition stopping means and said ignition retarding means, such that (a) said ignition stopping means stops ignitions successively as many times as a number of cylinders in said engine, and (b) then said ignition retarding means retards the ignition timing successively at least as many times as said number of cylinders when an engine speed is in a set range.

4,883,034
ENGINE IDLING SPEED CONTROL SYSTEM

Seiji Yashiki, Hiroshima; Hiroshi Hirano, Hatsukaichi, and Kazutomo Sasaki, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 29, 1988, Ser. No. 226,024
Claims priority, application Japan, Jul. 31, 1987, 62-192438
Int. Cl.[4] F02D *9/02, 41/16*
U.S. Cl. 123—339 **11 Claims**



1. A system for controlling idling speed of an internal combustion engine, comprising;

speed sensing means for sensing rotational speed of the engine;

determination means for determining whether the engine is in an idling state;

output adjusting means for adjusting engine output when the engine is determined to be in the idling state by said determination means;

memory means for storing a control variable of said output adjusting means in the form of a characteristic in which engine output rises approximately in proportion to a difference between a predetermined target idling speed and an actual idling speed with engine speed serving as a parameter;

control means responsive to outputs from said determination means and said speed sensing means for obtaining from said memory means a control variable corresponding to engine speed at idling, and for controlling said output adjusting means on the basis of said control variable;

load detecting means for detecting whether an external load is connected with the engine in operational relation; and

control variable characteristic changing means for changing characteristic of said control variable from said memory means responsive to output from said load detecting means.

4,883,035
METHOD AND DEVICE FOR CONTROLLING THE OPERATION OF AN ENGINE FOR A VEHICLE

Setsuhiro Shimomura, and Yukinobu Nishimura, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

PCT No. PCT/JP88/00133, § 371 Date Oct. 11, 1988, § 102(e) Date Oct. 11, 1988, PCT Pub. No. WO88/06235, PCT Pub. Date Aug. 25, 1988
PCT Filed Feb. 10, 1988, Ser. No. 265,803
Claims priority, application Japan, Feb. 12, 1987, 62-30019
Int. Cl.[4] F02D *9/08, 41/14*
U.S. Cl. 123—361 **13 Claims**

1. An engine control method for a vehicle in which a throttle valve in an engine intake passage is operatively associated with an accelerator pedal such that the opening degree of said throttle valve is changed by operation of said accelerator pedal so as to control the amount of intake air sucked into an engine, said method comprising:

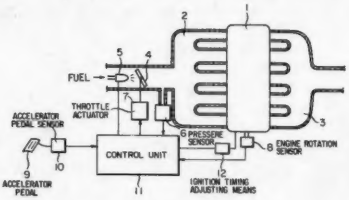
sensing the amount of operation of said accelerator pedal imparted by an operator;

sensing the load condition of said engine;

sensing the number of revolutions per minute of said engine;

setting a target degree of opening of said throttle valve based on at least one of the sensed amount of accelerator pedal operation, the sensed engine load condition and the sensed number of revolutions per minute of said engine;

sensing intake strokes of said engine; and

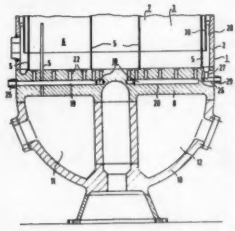


controlling said throttle valve in such a manner that, when said accelerator pedal is operated by the operator, said throttle valve is operated to move to the target degree of opening in synchronization with the intake stroke of said engine as sensed.

4,883,036
STEAM GENERATOR

Zvonimir Sterk, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Nov. 9, 1988, Ser. No. 269,236
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1987, 3738347
Int. Cl.[4] F22B *37/48*
U.S. Cl. 122—383 **6 Claims**



1. Steam generator, comprising a vertically elongated housing, a horizontal tube plate in said housing, and a U-shaped tube bundle in said housing, said tube bundle having mutually spaced apart legs defining an intermediate space therebetween and tube ends disposed in said tube plate, said tube plate having a horizontal blow-down line formed therein over the width of said tube bundle, and said tube plate having vertical bores formed therein leading from said blow-down line into said intermediate space.

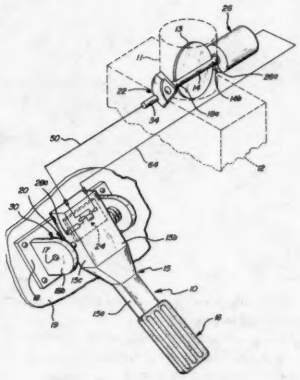
4,883,037
THROTTLE CONTROL SYSTEM

Brian D. Mabee, Warren, and Keith V. Leigh-Monstevens, Troy, both of Mich., assignors to Automotive Products plc, Warwickshire, England

Continuation-in-part of Ser. No. 156,850, Feb. 17, 1988. This application Jul. 5, 1988, Ser. No. 214,751
Int. Cl.[4] F02D *41/10*
U.S. Cl. 123—399 **39 Claims**

1. In a motor vehicle throttle control system of the type including a throttle valve member position sensing means operative to generate a first electrical signal representing the position of the throttle valve member, accelerator member

position sensing means operative to generate a second electrical signal representing the position of the accelerator member, control means receiving the first and second signals and operative to generate a control signal based on a comparison of the first and second signals, and actuator means receiving the control signal and operative to position the throttle valve



control member in proportion to the control signal, the improvement wherein:

(A) at least one of said position sensing means comprises a sensor device and a target device; and

(B) said sensor device and said target device are moved relative to each other in response to movement of the associated control member.

4,883,038

FUEL SUPPLY CONTROL SYSTEM FOR MULTI-CYLINDER INTERNAL COMBUSTION ENGINE WITH FEATURE OF SUPPRESSION OF OUTPUT FLUCTUATION BETWEEN INDIVIDUAL ENGINE CYLINDERS

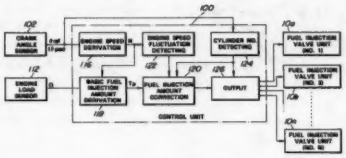
Shinpei Nakaniwa, Isezaki, Japan, assignor to Japan Electronic Control Systems Co., Ltd., Isezaki, Japan

Filed Nov. 2, 1987, Ser. No. 115,371

Claims priority, application Japan, Oct. 31, 1986, 61-258488; Dec. 23, 1986, 61-305350; Aug. 12, 1987, 62-200047

Int. Cl.[4] F02D *41/26*

U.S. Cl. 123—436 **34 Claims**



10. A fuel supply control system for an internal combustion engine which has a plurality of engine cylinders, comprising:

first means for delivering a controlled amount of fuel for respective engine cylinders at mutually independent and controlled timing;

second means for monitoring a preselected engine driving condition and producing an engine driving condition indicative signal;

third means for deriving a fuel delivery amount for respective engine cylinders on the basis of the value of said engine driving condition indicative signal;

fourth means for monitoring engine speed variation for detecting fluctuation of combustioning conditions between respective engine cylinders;

fifth means, responsive to the fluctuation of the combustioning condition in excess of a predetermined magnitude, to derive a correction value for correcting said fuel delivery amount based thereon; and

sixth means for controlling said first means at said controlled timing for delivering the fuel in the controlled amount corresponding to the fuel delivery amount corrected by said fifth means.

4,883,039

FUEL SUPPLY CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

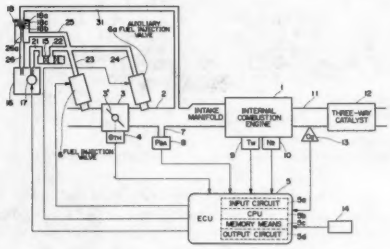
Kazushige Toshimitsu; Masayuki Ueno, and Hisashi Igarashi, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 130,635, Dec. 9, 1987, Pat. No. 4,825,834. This application Sep. 30, 1988, Ser. No. 252,378

Claims priority, application Japan, Dec. 10, 1986, 61-294283; Dec. 10, 1986, 61-294286; Dec. 10, 1986, 61-294287

Int. Cl.[4] F02M *69/00*

U.S. Cl. 123—463 **6 Claims**



1. A method of controlling the supply of fuel to an internal combustion engine having a plurality of cylinders, an intake passage having an intake manifold connected to said cylinders, a throttle valve arranged in said intake passage at a location upstream of said intake manifold, at least one first fuel injection valve arranged in said intake passage at a location upstream of said intake manifold and downstream of said throttle valve, at least one second fuel injection valve arranged in said intake passage at a location upstream of said throttle valve, and pressure regulating means for regulating the pressure of fuel supplied to both said first and second fuel injection valves, wherein said first and second fuel injection valves are selectively operated to supply fuel to said cylinders in dependence on operating conditions of said engine, the method comprising the steps of:

(a) detecting pressure within said intake passage at a location downstream of said throttle valve;

(b) regulating the pressure of fuel supplied to both said first and second fuel injection valves by means of said pressure regulating means in response to the detected pressure within said intake passage in a manner such that said first fuel injection valve has a discharge pressure thereof maintained constant and said second fuel injection valve has a discharge pressure thereof variable with the pressure within said intake passage;

(c) detecting whether said engine is operating in a predetermined low load condition;

(d) operating said first fuel injection valve to supply fuel to said cylinders when it is detected that said engine is operating in said predetermined low load condition; and

(e) operating at least said second fuel injection valve for a fuel injection period which is determined based at least in

part on a value of said discharge pressure of said second fuel injection valve determined from the detected pressure within said intake passage, to supply fuel to said cylinders when it is detected that said engine is operating in an operating condition other than said predetermined low load condition.

4,883,040

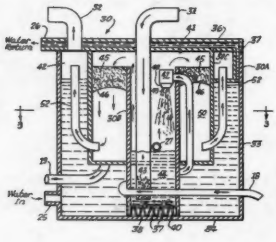
FUEL VAPORIZER

William C. Rocky, 3242 Lennard St., Ft. Pierce, Fla. 34984

Filed Feb. 5, 1988, Ser. No. 152,818

Int. Cl.[4] F02M *31/00, 31/08, 31/10*

U.S. Cl. 123—557 **9 Claims**



1. A fuel system for an internal combustion engine, comprising:

in combination: fuel supply means connected to a fuel source; selector valve connected to said fuel supply means for directing fuel into one of two possible flow paths; vaporizer means selectively connected to one of said two possible flow paths; carburetor means selectively connected to the other of said two possible flow paths; first and second heating means operatively connected to said vaporizer means for imparing heat to fuel in said vaporizer means and vapor collecting means positioned within said vaporizer means whereby said liquid fuel is converted into vapors and conduit means connecting said vapor collecting means to said carburetor means permits said internal combustion engine to operate on fuel vapors when said selector valve means directs said liquid fuel to said vaporizer means;

wherein said vaporizer means comprises a first cylindrical member sealed at its top and bottom; a second cylindrical member centrally positioned relative to said first cylindrical member and a third cylindrical member concentrically positioned between said first and second cylindrical members; said second cylindrical member being open at its uppermost end and closed at its bottom end, said third cylindrical member being closed at its upper and lower ends, a cylindrical chamber formed between said second and third cylindrical members; said first heating means in fluid contact with each of said first; second and third cylindrical members, fuel spray head means positioned in said second cylindrical member for directing fuel toward the bottom of of said second cylindrical member; said second heating means comprising a downwardly directed tube having a perforated end portion for conducting and releasing exhaust gases into said second cylindrical member below the level of fuel contained therein; said second cylindrical memer forming a first vapor generating chamber for fuel vapors and vapor collecting means in said vaporizer means.

4,883,041

SUPERCHARGING PRESSURE CONTROL DEVICE

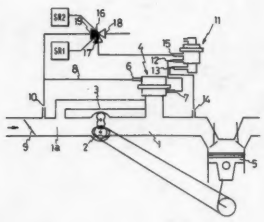
Masahiro Mochizuki, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 26, 1988, Ser. No. 224,327

Claims priority, application Japan, Jul. 31, 1987, 62-191917

Int. Cl.[4] F02D *23/00*

U.S. Cl. 123—564 **3 Claims**



1. A supercharging pressure control apparatus for an internal combustion engine comprising:

an intake passage communicating with said engine,

a supercharger disposed in said intake passage,

a throttle valve disposed in said intake passage upstream of said supercharger,

a by-pass passage for by-passing said supercharger, said by-pass passage having an entrance communicating with said intake passage at a location between said throttle valve and said supercharger, and an exit communicating with said intake passage downstream of said supercharger,

supercharging pressure control means disposed in said by-pass passage for controlling the opening and closing thereof, and

main control means operably connected to said supercharging pressure control means for controlling said supercharging pressure control means, said main control means including:

sensing means for sensing engine speed and a degree of opening of said throttle valve, and

actuating means operably interconnecting said sensing means and said supercharging pressure control means to:

selectively close and open said by-pass passage in response to the pressure difference between the pressure in said intake passage upstream of said supercharger on the one hand, and on the other hand, either atmospheric pressure or the pressure in said intake passage downstream of said supercharger, when the engine speed is below a first predetermined value or when the degree of opening of said throttle valve is below a second predetermined value, and

open said by-pass passage in accordance with engine speed when the engine speed is above said first predetermined value and when the degree of opening of said throttle valve is above said second predetermined value.

4,883,042

AIR GUNS

Roger D. Wackrow, Redditch, England, assignor to BSA Guns (UK) Limited, United Kingdom

Filed Mar. 10, 1988, Ser. No. 166,392

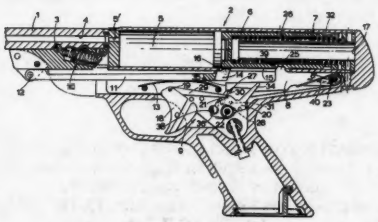
Claims priority, application United Kingdom, Mar. 13, 1987, 8705994

Int. Cl.[4] F41B *11/00*

U.S. Cl. 124—67 **7 Claims**

1. An air gun having a barrel and comprising a piston which is engaged by a cocking bar during a cocking stroke to force the piston back within a cylinder having a bore and a main

spring acting against the piston therein, the piston being held against the compressed main spring by a sear and a trigger mechanism retaining the sear in engagement with the piston until the gun is fired, upon which the sear becomes displaced by the piston permitting the piston to fly forwards in the cylinder and so compressing air within the cylinder to expel a pellet from the barrel of the gun, the piston having at least first and second axially spaced positions in the bore at which it can be held in the bore by the sear and in which positions the spring is at least partially compressed, the gun including interengeable means for enabling the cocking bar to engage the piston so as to move the piston during a first cocking stroke in a first stage along the cylinder to the first position at which it is retained by the s ar while the cocking bar is returned to enable the cocking



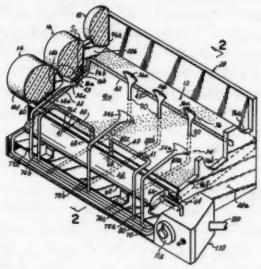
bar to re-engage the piston so as to enable a second cocking stroke to move the piston in a second stage from the first position to the second position, the sear comprising at least one latching stepped portion which is engageable in turn with at least a pair of axially spaced, forward and rearward, complementary recesses provided on the piston, and the piston forming a rearwardly rising ramp at a location between said forward and rearward recesses and adjacent to the rearward recess, whereby when the gun is fired from a cocked condition in which the piston is held at least by the engagement between the latching portion and the forward recess the latching portion is displaced from its engagement with the forward recess and slidingly engages the piston, sliding up the ramp as the piston flies past and, being so deflected outwardly past the rearward recess.

4,883,043

GAS-FIRED ARTIFICIAL LOG FIREPLACE ASSEMBLY

Ian Thow, Merseyside, England, and Ajay K. Gupta, Cincinnati, Ohio, assignors to Yale and Valor p.l.c., London, England

Filed Dec. 27, 1988, Ser. No. 290,294
Int. Cl.[4] F24C *3/00*
U.S. Cl. 126—512 **19 Claims**



1. A fireplace assembly for a fireplace having an opening, comprising:

a support structure;

a base plate of a refractory material that glows visibly above approximately 1470° F., said base plate having a generally planar upper surface and being supported by said support structure;

a front artificial log of refractory material having front, rear, top and bottom surfaces, said front log being supported by said support structure such that said bottom surface of said front log is spaced above said base plate to define a first elongated generally horizontal chamber section;

a second artificial log of refractory material having front, rear, top and bottom surfaces, said second log being supported by said support structure such that said bottom surface of said second log is proximal said base plate and said front surface of said second log is spaced from said rear surface of said front log to define a second elongated generally vertical chamber section, said first and second chamber sections collectively defining an elongated heat chamber having an angled cross-section;

said logs disposed generally horizontally and parallel to each other and to the plane of the opening of the fireplace; and

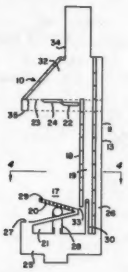
gas burner means supported by said support structure extending along and in front of said front log for directing blue flame jets into said first elongated chamber section toward said second log for heating to a visible glow said bottom and rear surfaces of said front log, said front surface of said second log, and said base plate, whereby substantial heat is radiated to the surroundings and an appearance of glowing logs and underlying embers is provided to enhance the aesthetics of the artificial log fireplace.

4,883,044

FIREPLACE ASSEMBLY

Thomas A. Levesque, 37 Riverview Ave., Mashpee, Mass. 02649

Filed Oct. 28, 1988, Ser. No. 263,866
Int. Cl.[4] F24B *5/00*
U.S. Cl. 126—515 **3 Claims**



1. A fireplace assembly, for installation as a freestanding unit or within a standard fireplace requiring no blowers, doors or catalytic converters, comprising:

means defining a primary chamber for burning combustible products;

said chamber having an angled grate located within for supporting said combustible products;

side walls and a rear wall partially surrounding said grate;

said walls defining a substantially vertical combustion enclosure having a center portion above said angled grate and adjacent to said rear wall of said enclosure;

an upper portion of said chamber for directing rising smoke and gasses;

secondary combustion means located behind said rear wall for inducing a secondary source of combustion;

dam.per means above said primary chamber means for forcing forward horizontal motion for said rising smoke and gasses;

a collection chamber;
said collection chamber being located above said primary chamber and said secondary combustion means for receiving said rising smoke and gasses from said primary chamber and said gasses from said secondary combustion means to initiate tertiary combustion;
a base manifold supply means;
said base manifold supply means provides outside air to said angle grates;
said base supply manifold further provides outside air around the outside perimeter of said primary combustion chamber and into said secondary combustion means;
a rear air channel;
said rear air channel being located behind said secondary combustion means for superheating outside air and connected to duct means having air openings at the upper front of the combustion chamber
said rear channel receives outside air from said base supply manifold.

4,883,045

METHOD FOR CONTROLLING GROWTH OF TISSUE CELLS

Erwin Theisz, 127 Randolph Rd., White Plains, N.Y. 10607

Continuation of Ser. No. 780,414, Sep. 26, 1985, abandoned. This application Nov. 19, 1987, Ser. No. 122,627
Int. Cl.[4] A61H *1/00*
U.S. Cl. 128—24 A **4 Claims**

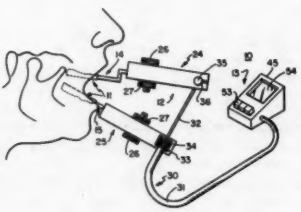
1. A method for inhibiting the growth of tumorous tissue in a mammal, comprising:
(a) exposing the mammal to an atmosphere of increased negative ion concentration of about 10,000 ions/cm^3 for a treatment period sufficient for causing the cell potential to be restored to healthy levels and
(b) simultaneously exposing the afflicted tissue to ultrasonic vibrations at a frequency of about 1,000 KHz for at least a portion of the treatment period, for about 25 minutes per day during said treatment period.

4,883,046

INVOLUNTARY OSCILLATOR SYSTEM FOR THE MANDIBLE

Mark G. Fontenot, Lafayette, La., assignor to Vitek, Inc., Houston, Tex.

Filed Apr. 12, 1988, Ser. No. 180,464
Int. Cl.[4] A61H *1/02*
U.S. Cl. 128—25 R **18 Claims**



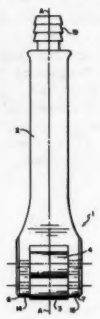
1. A mandible oscillator system, comprising:
an appliance having upper and lower intraoral portions for respectively mounting onto the upper and lower arches of a user, said upper and lower intraoral portions having, respectively, upper and lower extraoral extensions which coincide approximately with the midlines of said upper and lower arches;
upper and lower motor arms respectively releasably secured to said upper and lower extraoral extensions;
extraoral oscillating means including:
(a) motor means, including a linear stepper motor coupled between the outer ends of said motor arms for forcibly imparting oscillating motion to the outer end of said lower motor arm relative to the upper end of said upper motor arm, between predetermined start and end positions, within a predetermined angular range, and at a predetermined frequency and average velocity, whereby during one-half cycle of oscillation said lower arch is forced to move away from said upper arch, and during the other one-half cycle said lower arch is forced to move toward said upper arch, thereby forcefully imposing on said user rhythmic mandibular movements;
(b) programmable digital computer driver means for driving said motor; and
(c) electronic control means coupled to said driver means for adjusting said frequency, angular range, and average velocity of said oscillating motion.

4,883,047

APPARATUS FOR MASSAGING THE HUMAN BODY

Louis P. Guitay, 1 avenue Victor Hugo, 26000 Valence, France

Filed Mar. 16, 1988, Ser. No. 168,972
Claims priority, application France, Mar. 17, 1987, 87 03865
Int. Cl.[4] A61H *1/00*
U.S. Cl. 128—38 **4 Claims**



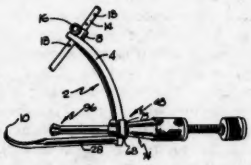
1. Massaging apparatus of the type in which a pair of parallel rollers of a predetermined diameter are mounted for free rotation in a manually operated housing, the latter being connected to means for creating a vacuum above the rollers wherein the housing includes two parallel walls at a distal end which support the pair of rollers therebetween, the rollers being mounted at a fixed separation therebetween, the housing also having a roof which, with the parallel walls and the rollers, defines a chamber whose height corresponds substantially to the diameter of the rollers, and in which a conduit connects said vacuum creating means to said chamber; comprising the improvement wherein said rollers project slightly beyond the parallel walls and the rollers have a tangent that lies substantially along the roof of said chamber but with a small clearance on the order of a few hundredths of a millimeter being provided between the periphery of two rollers and the roof of the chamber to permit rotation of the rollers, said clearance alone constituting the only vacuum sealing means between the roof of the chamber and the periphery of the rollers, and said vacuum conduit flares out at the roof of the chamber to spread over substantially the entire space between the rollers, wherein there is a fixed radial spacing between the periphery of the rollers that is substantially equal to the diameter of the rollers.

4,883,048

APPARATUS AND METHOD FOR USE IN PERFORMING A SURGICAL OPERATION

Mark L. Purnell, 323 Free Silver Dr.; Robert R. Oden, P. O. Box 660, both of Aspen, Colo. 81611; William L. McCune, 1739 West 35th, Denver, Colo. 80211, and Michael E. Berkeley, 1695 Silver King Dr., Aspen, Colo. 81611

Division of Ser. No. 915,122, Oct. 3, 1986, Pat. No. 4,781,182.
This application Aug. 15, 1988, Ser. No. 232,102
Int. Cl.[4] A61F 5/04
U.S. Cl. 128—92 VD 8 Claims



1. A method for use in the reconstruction of a cruciate ligament comprising:

preparing a knee for an arthroscopic operation;

providing an arcuate support means having a longitudinal axis comprising an arc of a circle having a center;

attaching a targeting means to said arcuate support means so that said targeting means has a target area at said center of said circle;

attaching a clamping means to said arcuate support means for cooperation with said target means to hold said target area at a desired location;

arthroscopically placing said target area at a position relative to the anatomic center of the original cruciate ligament on the tibia;

clamping said targeting means on said tibia so that said target area remains in said position;

providing a guide means on said arcuate support means, said guide means having a passageway extending therethrough and having a longitudinal axis coinciding with a ray from said center of circle;

inserting a kirschner wire through said guide means and through said tibia until said kirschner wire hits said target area;

removing said arcuate support means, said targeting means, said clamping means and said guide means;

over-reaming said kirschner wire to form a passageway in said tibia;

attaching another targeting means having a target area to said clamping means;

arthroscopically inserting a suture into said knee;

tying one end of said suture to said target area of said another targeting means;

arthroscopically placing said target area of said another targeting means at a position relative to the anatomic center of the original cruciate ligament on the femur;

clamping said another targeting means on said femur so that its target area remains in said position;

arthroscopically moving said suture through said passageway formed in said tibia;

providing an excursion device;

securing said suture to said excursion device so that any movement of said suture can be observed;

performing an isometric test by flexing said knee through positions of 0 degree to 90 degree of movement;

observing any movement of said suture during said movement of said knee to ensure that any movement is less than the required limit;

attaching said arcuate support means and said guide means to said clamping means;

inserting a kirschner wire through said guide means until said kirschner wire hits said target area;

removing said arcuate support means, said targeting means, said clamping means and said guide means;

over-reaming said kirschner wire to form a passageway through said femur; and

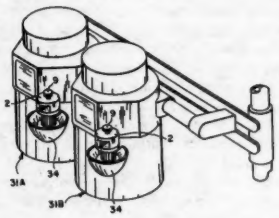
arthroscopically placing a cruciate ligament graft substitute in and extending between the tibial and femoral passageways.

4,883,049

APPARATUS FOR USE IN REFILLING AN ANESTHETIC VAPORIZER

Sandy McDonald, Barrie, Canada, assignor to Southmedic Incorporated, Barrie, Canada

Continuation of Ser. No. 873,954, Jun. 13, 1989, abandoned.
This application Feb. 5, 1988, Ser. No. 154,444
Int. Cl.[4] A61M 17/00
U.S. Cl. 128—202.22 8 Claims



1. Apparatus for use in refilling a standard anesthetic vaporizer canister having a threaded female fluid refill inlet, comprising:

a body having an upper guide section provided with a male threaded base section means extending therefrom for removably securing in the re-fill inlet of the canister and an elongated passage extending through said guide section at an angle to said base section means and defining a tubular channel of a predetermined cross section extending through said guide section perpendicularly to said base section means, said channel having an aperture in the lower surface of said channel, duct means extending through said base means for fluidically communicating the aperture with the canister

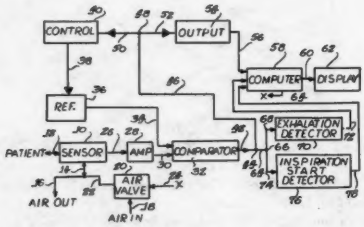
a coupling having inlet means at one end for fluidically communicating with a supply of liquid anesthetic and a dispensing key at its other end for connecting to said body, said dispensing key conforming in cross sectional size and shape to said tubular channel and being adapted to slide axially into said channel, said dispensing key having a fluid discharge outlet means in the lower surface thereof for fludically communicating said inlet means with the aperture in the lower surface of the channel;

abuttment means extending into and located in said tubular channel for cooperative engagement with said dispensing key so as to limit the movement of said dispensing key in said channel to fix the fluid discharge outlet means of said dispensing key in alignment with the aperture in the lower surface of said channel only when a dispensing key so cooperatively configured is axially received in said channel.

4,883,050
CIRCUIT PROVIDING INDICATION OF AIR ENTRAPMENT IN PATIENT'S LUNGS

Robert Urman, Schaumberg; Alfred G. Brisson, Kildeer, and Cristopher Nowacki, Long Grove, all of Ill., assignors to Nortgate Research, Inc., Arlington Heights, Ill.

Filed Feb. 29, 1988, Ser. No. 161,754
Int. Cl.[4] A62B 9/04
U.S. Cl. 128—202.27 **3 Claims**

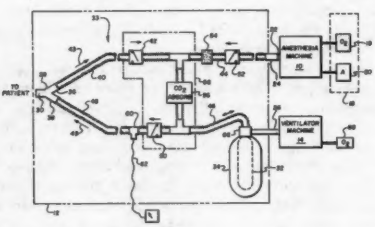


1. Apparatus for patient ventilation comprising forced ventilation means for connection to a patient, sensor means connected to said ventilation means for producing an electrical signal in accordance with air flow on inspiration and on expiration, first signal means connected to said sensor means for detecting when expiration drops below a predetermined threshold and producing a first electrical output in accordance therewith, second signal means connected to said sensor means and producing a second electrical output upon start of inspiration, timing means to which said first and second signal means are connected and producing a third electrical output if said first and second electrical outputs are closer in time than a predetermined time, and alarm means to which said third electrical output is connected and providing an alarm if a plurality of said first and second electrical outputs are closer in time than said predetermined time.

4,883,051
DISPOSABLE BREATHING SYSTEM AND COMPONENTS

Dwayne R. Westenskow, Salt Lake City, and Fidel Silva, Sandy, both of Utah, assignors to Summa Vest, Inc., Salt Lake City, Utah

Filed Feb. 18, 1988, Ser. No. 158,949
Int. Cl.[4] A62B 7/00; A61M 16/00
U.S. Cl. 128—204.21 **48 Claims**



1. An anesthesia system comprising:

anesthesia machine means connected to an external gas source to receive gas therefrom, and connected to continuously supply a preselected mixture of gas, said anesthesia machine means have means to mix the gas received into said preselected mixture of gas;

a disposable breathing circuit interconnectable between said anesthesia machine means and a patient, said disposable breathing circuit having:

first connector means for connection to said anesthesia machine means to receive said preselected mixture of gas therefrom,

second connector means for connection to said patient to supply and receive respiratory gas,

reservoir means connected for receiving, storing and supplying said preselected mixture of gas and for receiving, storing and supplying said respiratory gas and for adding said preselected mixture of gas thereto,

tube means interconnected between said first connector means, second connector means and said reservoir means to communicate said respiratory gas from said patient to said reservoir means upon expiration of gas from said patient and from said reservoir means to said patient upon inspiration of gas to said patient, and to communicate said preselected mixture of gas from said anesthesia machine means to said reservoir means,

actuator means positioned operatively proximate to said reservoir means to urge said reservoir means between a collapsed first position in which said preselected mixture of gas and respiratory gas therewithin are supplied from said reservoir means to the patient via said tube means and an expanded second position in which the respiratory gas is expelled from the patient via said tube means and to receive said preselected mixture of gas via said tube means from said anesthesia machine means;

excessive gas pressure relief means in communication with said respiratory gas and said preselected mixture of gas during all but the time said gases are being supplied from said reservoir means to the patient; and

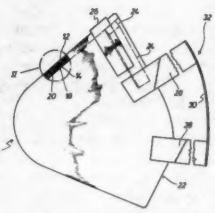
means operated by the flow of gases from the reservoir means to the patient for blocking communication of the excessive gas pressure relief means with the respiratory gas and the preselected mixture of gas during supply of said gases to the patient; and

ventilation machine means for generating inspiration signals and expiration signals in accordance with a preselected pattern and removably connected to said actuator means to supply said inspiration signals and expiration signals thereto for urging said reservoir means between said first and second positions respectively.

4,883,052
PROTECTIVE BREATHING MASK

Anna-Maria Weiss, Wunsiedel, and Klaus Smolik, Gefrees, both of Fed. Rep. of Germany, assignors to Helsa-Werke Helmut Sandler GmbH & Co. KG, Gefrees, Fed. Rep. of Germany

Filed Sep. 11, 1987, Ser. No. 95,816
Claims priority, application Fed. Rep. of Germany, Jun. 11, 1987, 3719420
Int. Cl.[4] A62B 7/10
U.S. Cl. 128—205.27 **32 Claims**



1. A multi-layer protective breathing mask for covering the mouth and the nose of a wearer comprising an outer layer, an inner layer and a filter element between the outer and inner layers, the filter element comprising a particle filter which comprises a layer of electret material, and an adsorber filter

which comprises at least one layer of open-pore foam material provided with at least two different particle sizes of adsorber material, said particle filter being arranged at the outward side of said filter element and said adsorber filter being arranged at the inward side of said filter element.

4,883,053

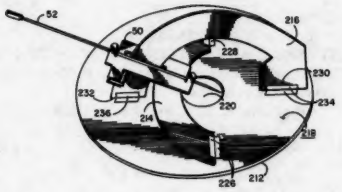
SELF-SUPPORTING ANGULATOR DEVICE FOR PRECISE PERCUTANEOUS INSERTION OF A NEEDLE OR OTHER OBJECT

Morris Simon, Boston, Mass., assignor to Beth Israel Hospital, Boston, Mass.

Continuation of Ser. No. 98,142, Sep. 18, 1987, abandoned. This application Apr. 17, 1989, Ser. No. 339,916

Int. Cl.[4] A61B *17/00*

U.S. Cl. 128—303 B **8 Claims**



1. A folded angulator erectable on demand into a self-supporting device useful for precise positioning and percutaneous insertion of an object into a subject, said folded angulator comprising:

a flexible base plate having a plurality of external surfaces, said base plate being positionable at will on the body of the subject;

at least one primary member rotatably hinged at a primary position to said base plate and rotatably extendable at a range of about 180 degrees over said base plate;

at least one secondary member rotatably hinged to said base plate at a secondary position which is substantially spatially removed from said primary position on said base plate, said secondary member being rotatably extendable at a range of about 180 degrees over said base plate for intersection with said primary member at a plurality of different angles of intersection over about a 180 degree range;

means for coupling said secondary member to said primary member over the 180 degree range at a plurality of different angles of intersection;

means for holding the object to be inserted upon at least one of said members after said primary and secondary members are coupled at a desired angle of intersection; and

an adhesive disposed upon an external surface of said flexible base plate for securing said base plate to the body of the subject at a desired position.

4,883,054

OPTICAL FIBER BREAK DETECTOR

Terry A. Fuller, Highland Park, and John G. Kwasegroch, Algonquin, both of Ill., assignors to Fuller Research Corporation, Vernon Hills, Ill.

Filed Dec. 9, 1987, Ser. No. 130,828

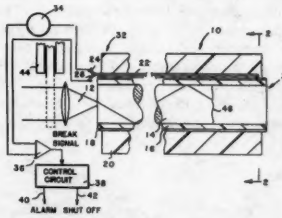
Int. Cl.[4] A61B *17/00*

U.S. Cl. 128—303.1 **15 Claims**

1. Apparatus for detecting a break in an optical fiber adapted for carrying optical energy such as laser energy, comprising:

an optical fiber having a core, cladding means concentric with and surrounding the core and sheath means concentric with and surrounding the cladding means,

detector means within said sheath means and having a portion thereof contiguous the cladding means, the detector means being adapted to detector both (1) a break in the portion contiguous the cladding means as a result of a break in the fiber independent of optical energy in the fiber and (2) a change in transmission of optical energy resulting from a break in the fiber without concomitant break in said portion, the detector means providing a break signal indicative of a break in the fiber.



4,883,055

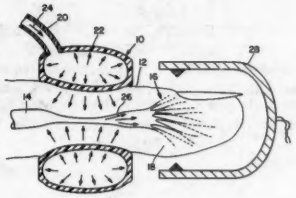
ARTIFICIALLY INDUCED BLOOD PULSE FOR USE WITH A PULSE OXIMETER

Edwin B. Merrick, Stow, Mass., assignor to Puritan-Bennett Corporation, Wilmington, Mass.

Filed Mar. 11, 1988, Ser. No. 167,301

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—633 **5 Claims**



1. A pulse oximeter for determining oxygen saturation comprising:

a means for transmitting at least two wavelengths of light related to hemoglobin light absorption through a body member;

a cuff means for artificially inducing blood pulse in the body member;

photodetection means for detecting light transmitted through said body member and for producing electrical signals that are proportional to intensities of light detected for each wavelength of light; and

electronic means for receiving the electronic signals produced by the photodetection means when blood is pulsed in said body member by said cuff means for determining oxygen saturation.

4,883,056

PNEUMATIC PRESSURE PROBE

Maurice E. Langham, Timonium, Md., assignor to Ocular Blood Flow Laboratories, Inc., Timonium, Md.

Filed Nov. 5, 1987, Ser. No. 117,235

Int. Cl.[4] A61B *3/16*

U.S. Cl. 128—645 **15 Claims**

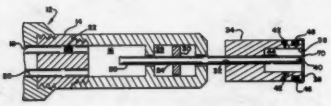
1. A pneumatic pressure probe which comprises:

a hollow elongated handle defining therewithin a pressure chamber, a pressurizing gas passageway in communica-

tion with the pressure chamber and adapted for operable association with a pressurized gas source for pressurizing the pressure chamber, and a gas exit passageway in communication with the pressure chamber and adapted for communication with a pressure transducer means;

a hollow, elongated and foreshortenable shaft received in said handle, mounted so as to transmit no force from the pressure chamber, and having a proximal end extending into said pressure chamber while a distal end thereof extends beyond the handle; and

a sensor head mounted to the distal end of said hollow shaft and defining a substantially planar contact face for placement on the epithelium of an organ, a cavity that provides a venting chamber which extends to and terminates in a sensing aperture in the contact face, and peripheral vent means in communication with the cavity;



said shaft distal end extending into said cavity for a fixed distance and terminating in a thrust nozzle that is substantially coplanar with but does not extend beyond a plane defined by said contact face; and

said pressure chamber being closed to the atmosphere and communicating with said cavity through said hollow shaft so that the total gas flow from the pressure chamber is through the hollow shaft to the sensor head.

4,883,057

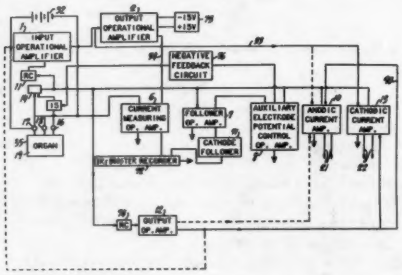
CATHODIC ELECTROCHEMICAL CURRENT ARRANGEMENT WITH TELEMETRIC APPLICATION

Patricia A. Broderick, Bronx, N.Y., assignor to Research Foundation, The City University of New York, New York, N.Y.

Continuation-in-part of Ser. No. 608,426, May 9, 1984, abandoned. This application Sep. 9, 1986, Ser. No. 905,579

Int. Cl.[4] A61B *5/07*

U.S. Cl. 128—631 **34 Claims**



1. A method for measuring the rate of release and/or reuptake of one or more biogenic chemicals in vivo and in situ in a warm-blooded or cold-blooded animal brain or body comprising:

connecting said brain or body to an electrical circuit comprising:

an auxiliary electrode placed in contact with an outer layer of an organ or sub-organ to be analyzed;

a reference electrode placed in contact with said outer layer of said organ or sub-organ to be analyzed;

an indicator microelectrode which is packed with graphite paste and mineral oil modified with a compound selected from the group of fatty acids, fatty acid derivatives, perfluorosulfonated compounds and salts thereof which is inserted into said organ or sub-organ's interior;

a D.C. source and means for forming cathodic current connected between said reference electrode and said indicator electrode; said organ or sub-organ, auxiliary electrode, reference electrode and indicator electrode thus forming an electrochemical cell which produces output cathodic current;

means connected in series with said reference electrode for semidifferentiating the cathodic current and;

processing the signal which represents the output current as the semiderivative of the linear current function;

thereby producing a cathodic current which represents the rates of release and/or reuptake of one or more biogenic chemicals, the cathodic current enabling the detection of one or more biogenic chemicals which are reduced as well as oxidized and which therefore provides for reproducible results.

4,883,058

RIGHT CORONARY ANGIOGRAPHIC METHOD

Oscar F. Ruiz, Coconut Grove, Fla., assignor to Sherwood Medical Company, St. Louis, Mo.

Filed Jan. 6, 1988, Ser. No. 141,208

Int. Cl.[4] A61B *17/00*

U.S. Cl. 128—654 **4 Claims**

4. A method of performing a selective coronary arteriography on the right coronary artery of a human being comprising the steps of:

inserting a catheter having a catheter body through the aortic arch into the ascending aorta of the human being such that a tip portion of the catheter is disposed above the ostium of the right coronary artery;

orienting the catheter so that an open distal end of said catheter tip portion is pointed toward and in contact with the inner wall of said ascending aorta;

advancing the catheter tip portion toward the ostium of the right coronary artery by moving the distal end along and contacting said inner wall while biassing the tip portion of the catheter toward the inner wall of the ascending aorta the catheter body; and

inserting the distal open end of the tip portion in the ostium of the right coronary artery responsive to the advancing and biassing steps.

4,883,059

INTRAVAGINAL TRANSDUCER BIOPSY GUIDE

David Stedman, Kirkland, and Norio Harui, Seattle, both of Wash., assignors to Advanced Technology Laboratories, Inc., Bothell, Wash.

Filed Nov. 21, 1986, Ser. No. 933,708

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—660.01 **10 Claims**

1. An improved needle guide, for use in connection with a medical ultrasound scanhead to guide a biopsy needle, of the type comprising:

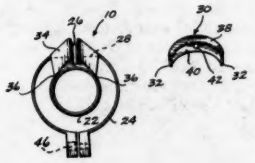
(a) a body;

(b) slot means on said body for directly engaging and guiding the biopsy needle; and

(c) attachment means for attaching said body to the ultra-

sound scanhead and providing a desired alignment between said slot means and the ultrasound scanhead,

the improvement comprising needle cover means which is slidably attached to said body, said needle cover means



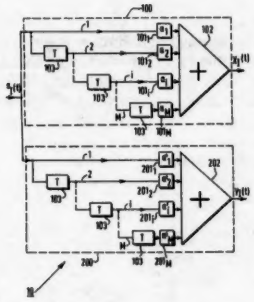
including means for covering the biopsy needle when the biopsy needle is within said slot means and preventing intimate contact between the needle and a patient until the needle is properly positioned.

4,883,060

DEVICE FOR ELIMINATING FIXED ECHOES FOR AN ULTRASONIC ECHOGRAPH

Patrick R. Pesque, Perigny, and Odile M. A. Bonnefous, Nogent sur Marne, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 6, 1988, Ser. No. 215,965
Claims priority, application France, Jul. 9, 1987, 87 09734
Int. Cl.[4] A61B *8/06*
U.S. Cl. 128—660.01 **5 Claims**



1. In an ultrasonic echograph having a pulse repetition period, T, a circuit for eliminating echo signals which represent fixed objects from a stream of echo signals, comprising:

first and second filters, each of said filters including:

M parallel lines connected to apply respective delays (i−1)T, where i=1, . . . M, to the stream of echo signals;

an adder; and

M weighting means, each of the weighting means applying signals from a corresponding line to an input of the adder with a respective weighting coefficient a_i; and

means which combine outputs of the first and second filters;

wherein, in each filter the sum of the weighting factors of the M weighting means is zero;

the phase response of the second filter shifted by (M−1)T with respect to the first filter; and

the impulse response of the second filter is

$$h_2(t)=h_1((M-1)T-t)$$

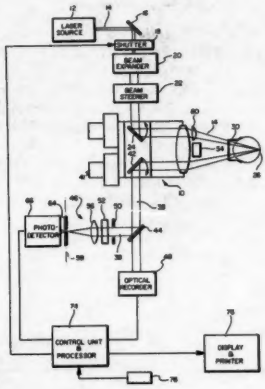
where $h_1(t)$ is the impulse response of the first filter.

4,883,061

METHOD AND APPARATUS FOR MEASURING THE THICKNESS OF EYE COMPONENTS

Ran C. Zeimer, Chicago, Ill., assignor to The Board of Trustees of the University of Illinois, Urbana, Ill.

Filed Feb. 29, 1988, Ser. No. 162,011
Int. Cl.[4] A61B *5/10, 6/00*
U.S. Cl. 128—665 **30 Claims**



1. Apparatus for enabling the determination of the thickness of the retina of an eye between the anterior surface and the posterior surface of the retina, said apparatus comprising:

a light source providing a coherent monochromatic beam;

means for focusing said beam on the retina to provide a first reflected beam reflected from the anterior surface of the retina and a second reflected beam reflected from the posterior surface of the retina; and

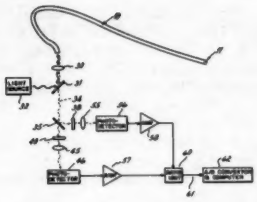
detection means for detecting said first reflected beam and said second reflected beam, wherein the relationship between said first and second reflected beams enables the determination of the thickness of the retina.

4,883,062

TEMPERTURE AND PRESSURE MONITORS UTILIZING INTERFERENCE FILTERS

Warren B. Nicholson, Worthington, Ohio, assignor to Medex, Inc., Hilliard, Ohio

Filed Apr. 25, 1988, Ser. No. 186,086
Int. Cl.[4] A61B *5/02*
U.S. Cl. 128—667 **5 Claims**



1. Apparatus for measuring a parameter of blood comprising,

an optical fiber having at its end an edge filter consisting of alternating metal and dielectric layers, the layers being

dimensionally variable in the presence of the blood parameter to be measured,

means for launching a polychromatic light into the end of said optical fiber to produce r reflected light having an intensity versus wavelength reflection curve whose transition line shifts with variations in said blood parameter,

means for measuring the amount of the shift of the edge of the reflected curve and means for converting the magnitude of said shift to units of said parameter.

4,883,063

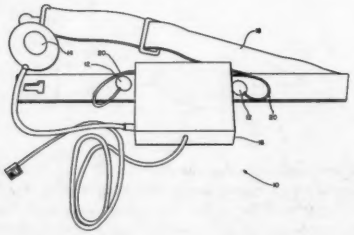
PERSONAL MONITOR AND PROCESS FOR HEAT AND WORK STRESS

Thomas E. Bernard, Pittsburgh; Gary W. Sherwin, Yukon; William L. Kenney, Jr., Boalsburg, and Debra A. Lewis, State College, all of Pa., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Continuation of Ser. No. 55,654, May 29, 1987, abandoned. This application Apr. 13, 1989, Ser. No. 338,374

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—670 **19 Claims**



1. A personal monitor for work and heat stress which comprises a heart beat sensor producing output electrical signals indicating a user's heart beats, means for storing heart beat information corresponding to the heart beat signals produced over predetermined time intervals, information processing means connected to receive the heart beat information from said storing means, said information processing means being configured to analyze the heart beat information incrementally over the predetermined time intervals through moving time averages with a plurality of different time bases to obtain a physiological demand during the predetermined time intervals and to compare the obtained physiological demand against a stored physiological demand limit, and means for providing an indication to the user when the stored physiological demand limit has been exceeded, said information processing means being configured and connected to control operation of said indication providing means.

4,883,064

METHOD AND SYSTEM FOR GATHERING ELECTROCARDIOGRAPHIC DATA

Richard J. Olson, Ramsey, and David C. Gust, Andover, both of Minn., assignors to EquiMed Corporation, Plymouth, Minn.

Filed Nov. 19, 1987, Ser. No. 122,796

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—696 **28 Claims**

1. A method of generating electrocardiographic data from a patient, said method comprising:

placing at least three electrodes at discrete locations on the surface of said patient's body;

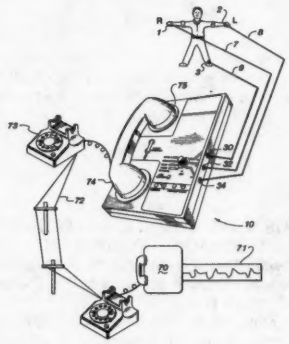
selecting a first pair of said electrodes and assigning one electrode of said first pair to measure a positive polarity and the other electrode of said first pair to measure a negative polarity;

continuously measuring the difference in electrical potential between said first pair of electrodes for a first time period of at least about 10 seconds and less than about 60 seconds;

selecting a second pair of said electrodes different from said first pair of electrodes and assigning one electrode of said second pair to measure a positive polarity and the other electrode of said second pair to measure a negative polarity;

continuously measuring the difference in electrical potential between said second pair of electrodes for a second time period of at least about 10 seconds and less than about 60 seconds consecutive to said first period;

selecting a third pair of said electrodes different from said



first and second pairs of electrodes and assigning one electrode of said third pair to measure a positive polarity and the other electrode of said third pair to measure a negative polarity;

continuously measuring the difference in electrical potential between said third pair of electrodes for a third time period of at least about 10 seconds and less than about 60 seconds consecutive to said second period; and

telemetrically transmitting or translating the chronological sequence of said measurements,

such that said electrocardiographic data comprises the chronological sequence of said measurements of electrical potential difference.

4,883,065

MICROPOTENTIAL ANALYZER—A HOLTER SYSTEM WITH COMPREHENSIVE ANALYSIS CAPABILITY FOR VERY LOW AMPLITUDE ELECTROCARDIOGRAPHIC SIGNALS AND METHOD

George J. Kelen, Staten Island, N.Y., assignor to Del Mar Avionics, Irvine, Calif.

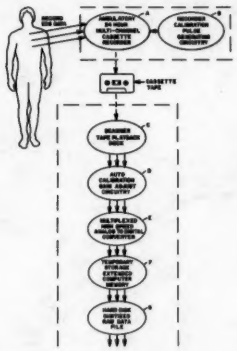
Filed Nov. 15, 1988, Ser. No. 271,903

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—711 **12 Claims**

1. A micropotential analyzer system for long term ambulatory multi channel recording, high speed playback and analysis of electrocardiographic (ECG) signals ranging in amplitude down to one microvolt, said system including: a multi channel magnetic tape Holter recorder; micropotential analyzing means coupled to the recorder for allowing a user to select from an entire recording on the recorder a precise segment of raw data that is to be the subject of micropotential analysis thereby permitting analysis of multiple data segments from a single tape on the recorder and reanalysis of any raw data set by multiple processing algorithms; and recording means coupled to said recorder for recording data on said recorder and

further incorporating circuitry which records on each signal channel on said recorder a calibration signal of precisely



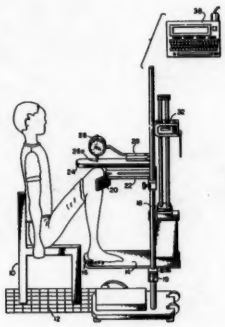
known shape and amplitude on a portion of the recording in each such signal channel.

4,883,066

HUMAN LIMB MEASURING SYSTEM AND METHOD

Harold D. Widdoes, Chadds Ford; Solomon H. Katz, Philadelphia, both of Pa., and Christine E. Cronk, Makanda, Ill., assignors to Intersciences Development Associates, Inc., Philadelphia, Pa.

Filed Feb. 9, 1988, Ser. No. 154,771
Int. Cl.[4] A61B 5/10
U.S. Cl. 128—774 13 Claims



1. A human limb measuring system comprising:

means for positioning and restraining the limb of a patient in a prescribed repeatable position;

means for compressing body tissue at the ends of said limb a prescribed amount;

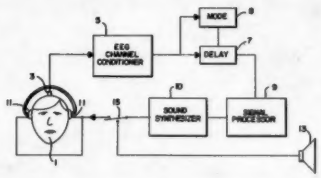
and means responsive to said compressing means for measuring the distance between a selected point on said compressing means and a reference point while said body tissue is compressed said prescribed amount.

4,883,067

METHOD AND APPARATUS FOR TRANSLATING THE EEG INTO MUSIC TO INDUCE AND CONTROL VARIOUS PSYCHOLOGICAL AND PHYSIOLOGICAL STATES AND TO CONTROL A MUSICAL INSTRUMENT

Joel Knispel, Timonium, and Geoffrey Wright, Baltimore, both of Md., assignors to Neurosonics, Inc., Baltimore, Md.

Filed May 15, 1987, Ser. No. 49,992
Int. Cl.[4] A61B 5/04
U.S. Cl. 128—732 71 Claims



1. A biofeedback apparatus useful for creating music, comprising:

means for receiving an ongoing EEG signal from at least one region of the brain of a biological entity, said at least one region of the brain responding to acoustical stimulation, said ongoing EEG signal having a voltage amplitude exhibiting semiperiodic change;

means for translating said ongoing EEG signal into music, said translating means including

means for generating an acoustical indication of the semiperiodic change in said ongoing EEG signal, and

means for generating musical flavor and adding said musical flavor to said acoustical indication;

means for directing said music so as to be received by the brain; and

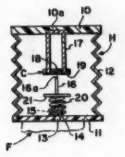
means for delaying said directing means for a period of time determined so that the brain response to said music occurs with a predetermined phase relationship with respect to the ongoing EEG signal received from said region of the brain.

4,883,068

BLOOD SAMPLING DEVICE AND METHOD

Frederick L. Dechow, Lake Leelanau, Mich., assignor to Dec in Tech, Inc., Gillette, N.J.

Filed Mar. 14, 1988, Ser. No. 167,778
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—760 14 Claims



1. In a disposable blood sampling device particularly for removing a small volume of blood from the epidermis of the body for testing purposes:

a. a housing comprising inner and outer, spaced apart, walls separated by an axially compressible, axially extending bridging enclosure;

b. said outer wall carrying an axially extending, evacuated, collecting container housed within said axially compressible enclosure and having an open end closed by a penetrable end member;

c. a double-ended cannula device axially slidably carried by

said inner wall in axial alignment with said end member, and having an end member-penetrating end and a skin-penetrating end;

d. said inner wall having a cannula device passing portion in axial alignment with said cannula device for passing the skin-penetrating end through the inner wall into the epidermis; and

e. means for preventing said cannula device from penetrating the end member of the collecting container when the inner and outer walls are relatively axially compressed, until after penetration of the epidermis by the cannula device.

4,883,069

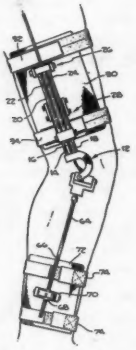
DYNAMIC JOINT MOTION ANALYSIS TECHNIQUE

Paul C. McLeod, Little Rock, Ark., assignor to Physical Diagnostics, Inc., Conway, Ark.

Division of Ser. No. 340,070, Sep. 21, 1981, abandoned, which is a division of Ser. No. 139,908, Mar. 31, 1980, Pat. No. 4,306,571. This application Jun. 10, 1983, Ser. No. 502,916

Int. Cl.[4] A61B *5/10*

U.S. Cl. 128—782 **2 Claims**



1. In an apparatus for the study of the motion of a joint between first and second limb members, said apparatus having a multiple plane electrical goniometer with first and second movable input members, first securing means for securing said first movable input member and said multiple plane electrical goniometer to said first limb member, second securing means for securing said second movable input member to said second limb member whereby relative angular movements between said first and said second limb members are sensed by said multiple plane electrical goniometer and converted to electrical signals,

the improvement wherein said first movable input member has a shape so as to preclude the interference of movements of said joint in extreme angular deviations by said apparatus,

the further improvement comprising internal beam means between said first means securing said first movable input member to said first limb member and said first movable input member, and means for adjusting the angle of said internal beam means to adjust the position of said multiple plane goniometer relative to said joint depending upon the musculature and general configuration of said first limb member.

4,883,070

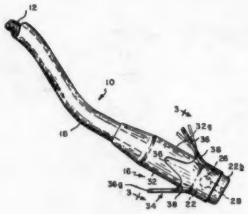
ENDOCARDIAL PACING LEAD

Ralph E. Hanson, Pace Medical, Inc., 391 Totten Pond Rd., Waltham, Mass. 02154

Filed Mar. 2, 1988, Ser. No. 163,367

Int. Cl.[4] A61N *1/05*

U.S. Cl. 128—785 **10 Claims**



1. An endocardial pacing lead comprising

A. a flexible insulated electrical conductor;

B. a rigid electrically conductive electrode member having a longitudinal axis;

C. means for mechanically and electrically connecting one end of said member to an end of said conductor, the opposite end of said member constituting a contact tip;

D. fixation means flaring outwardly from said member and away from said tip, said fixation means including a continuous frustoconical flexible, resilient skirt portion connected only at its smaller diameter edge to said member and invertible in the direction of said axis and a plurality of elongated, relatively thin leaves projecting from the larger diameter edge of said skirt portion at spaced apart locations therealong, said leaves constituting flexible resilient extensions of said invertible skirt portion.

4,883,071

INTRAVAGINAL DEVICE

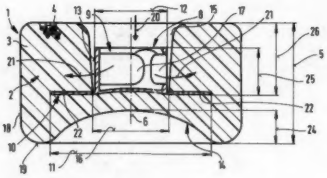
Ewald Pickhard, Redtenbachergasse 15, A-1160 Vienna, and Wolfgang Knogler, Görgengasse 27, A-1190 Vienna, both of Austria

Continuation of Ser. No. 908,704, Aug. 28, 1986, abandoned. This application Jan. 4, 1989, Ser. No. 294,933

Claims priority, application Austria, Nov. 15, 1984, 3622/84; Jul. 2, 1985, 1956/85

Int. Cl.[4] A61F *5/46*

U.S. Cl. 128—837 **15 Claims**



1. An intravaginally positionable device consisting essentially of an elastic carrying member of a synthetic resin foam having a medication incorporated therein, the carrying member comprising a substantially cylindrical block of the synthetic resin foam and the cylindrical block having a cylindrical wall defining a blind hole extending concentrically about the axis of the cylindrical block to an edge thereof, and an entraining element anchored in the carrying member during foaming of the synthetic resin foam to form the elastic carrying mem-

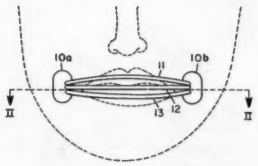
ber, the entraining element not extending beyond the edge and having a cylindrical surface extending upwardly adjacent the cylindrical wall, and the cylindrical surface of the entraining element defining openings capable of being engaged by a member for insertion or extraction of the device into and from the vagina.

4,883,072

MOUTH APPLIANCE FOR ASSISTING IN WEIGHT CONTROL

Edward W. Bessler, 8 Rosemont Ave., Fort Mitchell, Ky. 41017

Filed Feb. 13, 1989, Ser. No. 309,404
Int. Cl.[4] A61F *13/12*
U.S. Cl. 128—857 **6 Claims**



1. Apparatus for assisting in the reduction of food intake on the part of a person using the same, the combination comprising:

first and second pads;

a pressure sensitive adhesive on one side of said pads for securing said pads to a user's cheeks adjacent the corners of the mouth of the user;

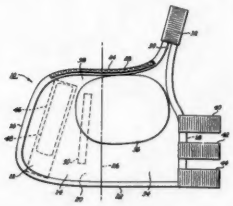
at least one narrow band curved to form an arch, the opposite ends of said band being connected to said first and second pads, respectively, the arch of said band projecting from the user's cheeks and arching over the junction of the user's lips out of contact therewith, said bands thereby inhibiting the passage of food through the lips of the user when the pads are secured to the user's cheeks, but not interfering with normal movement of the lips.

4,883,073

REMEDIAL DEVICE FOR TREATMENT OF CARPAL TUNNEL SYNDROME

Farooq Aziz, 3755 Warrensville Center Rd., Apt. #3, Shaker Heights, Ohio 44122

Filed Jul. 3, 1989, Ser. No. 375,527
Int. Cl.[4] A61F *5/00*
U.S. Cl. 128—878 **18 Claims**



1. A remedial device for treatment of carpal tunnel syndrome which permits limited wrist mobility by the wearer in both vertical and horizontal directions comprising in combination:

(a) a flexible substrate sized to fit entirely around the wearer's forearm to form upper, lower and side portions when secured in place and which extends longitudinally at one end from a location below the wearer's elbow to an opposite palm end approaching the metacarpal joints of the wearer's hand, the palm end further terminating in an elastic cuff gripping the wearer's hand while also including a projection extending forwardly therefrom at the wearer's thumb before the device is secured in place but extending backwardly therefrom when secured in place,

(b) a cushioning pad joined to the flexible substrate in the palm region,

(c) a first longitudinally extending splint restraining excess vertical mobility of the wearer's wrist and joined to the flexible substrate in the upper portion,

(d) a second longitudinally extending splint restraining excess horizontal mobility of the wearer's wrist and joined to the flexible substrate in a predetermined side portion, and

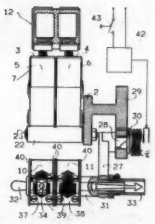
(e) releasable fastening means joined to the flexible substrate enabling the side portions to be secured together while also enabling the hand projection to be secured to the top portion.

4,883,074

STRIP GUIDE DEVICE, PARTICULARLY FOR A CIGARETTE MANUFACTURING MACHINE

Riccardo Mattei, Bologna, Italy, assignor to G.D Societa' per Azioni, Bologna, Italy

Filed Feb. 19, 1987, Ser. No. 16,217
Claims priority, application Italy, Feb. 28, 1986, 3345 A/86
Int. Cl.[4] A24C *5/04, 5/20, 5/31*
U.S. Cl. 131—84.1 **7 Claims**



1. In a cigarette manufacturing machine comprising a horizontal bed;

at least one belt for forming a continuous cigarette rod, said belt having a portion extending above and along said bed between a first and a second end thereof, being movable along said bed towards said second end, and being wound about a suction rotary pulley arranged at said first end;

a device for feeding a continuous stream of tobacco onto said belt portion, said tobacco feeding device extending above said first end and said pulley and defining between the stream of tobacco and the belt an input space for at least one paper strip;

a paper strip guide device for feeding at least one paper strip onto said belt portion, said strip guide device having a device for feeding an end of said paper strip to said input space, and

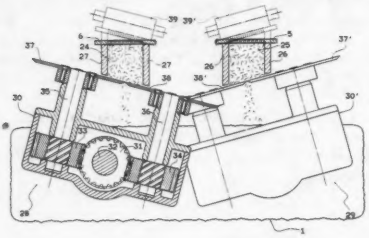
said paper feeding device comprising means for holding said end of said strip and designed to move between a first and a second position in which said holding means are arranged away from, and respectively within, said input space.

4,883,075

DUAL-ROD CIGARETTE MANUFACTURING MACHINE

Riccardo Mattei, and Salvatore Rizzoli, both of Bologna, Italy, assignors to G. D. Societa' per Azioni, Bologna, Italy

Filed Jul. 20, 1988, Ser. No. 221,888
Claims priority, application Italy, Aug. 3, 1987, 3589 A/87
Int. Cl.[4] A24C *5/18*
U.S. Cl. 131—84.4 **3 Claims**



1. A dual-rod cigarette manufacturing machine comprising:
means for forming two continuous tobacco beads;
two substantially parallel coplanar conveyor belts;
each conveyor belt being for advancing a respective tobacco bead along a path;
said two conveyor belts being arranged at a predetermined lateral distance from each other thereby defining a gap between them;
an associated tobacco shaving device, for shaving a respective tobacco bead, being located along the path of each conveyor belt;
each shaving device comprising first and second counter-rotating shafts lying in a first plane substantially perpendicular to the respective conveyor belt path;
the shafts of each shaving device being parallel to each other, and being inclined at a given angle in relation to a vertical second plane extending parallel to said conveyor belts and through said gap;
a first and a second shaving disc mounted on said first and second shafts of each shaving device respectively for rotation therewith; and
the two discs of each shaving device extending in a third plane perpendicular to said first plane, and having respective cutting edges substantially tangent to each other at a point along the respective belt path, and one of said discs projecting into said gap.

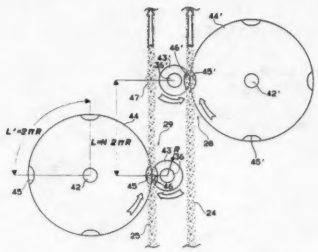
4,883,076

DUAL-ROD CIGARETTE MANUFACTURING MACHINE

Bruno Belvederi, S.Martino di Monte S.Pietro, Italy, assignor to G.D Societa' per Azioni, Bologna, Italy

Filed Oct. 31, 1988, Ser. No. 265,142
Claims priority, application Italy, Nov. 3, 1987, 3678 A/87
Int. Cl.[4] A24C *5/18*
U.S. Cl. 131—84.4 **4 Claims**

1. A dual-rod cigarette manufacturing machine (2) comprising:
means (3,4) for forming two continuous tobacco beads (24,25);
two substantially parallel, coplanar conveyor belts (5,6) for transferring the two beads (24,25) to an unloading station (13);
a pair of shaving devices (28,29);
one of the pair of shaving devices (28,29) being positioned along the path of each of the conveyor belts (5,6), for shaving a tobacco bead (24,25) transferred by the belt;
each shaving device comprising a pair of first and second counter-rotating disks (43, 44; 43', 44') arranged respectively inside and outside the said bead (24,25) and each disk being mounted on a shaft;
each disk having a cutting edge and being arranged with the respective cutting edges substantially tangent along the path of the respective bead (24,25);



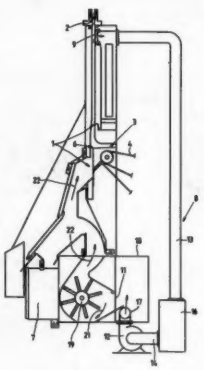
the shafts of the disks (43, 44; 43', 44') lying in a plane substantially perpendicular to the traveling direction of the tobacco beads (24,25); and
the diameter of the first disk (43,43') of each shaving device (28,29) is approximately equal to the distance between the two tobacco beads (24,25).

4,883,077

APPARATUS FOR TRANSPORTING AND TREATING PARTICLES OF TOBACCO AND THE LIKE

Pierre Irigoyen, Vert Saint Denis, France, assignor to Decouflé s.a.r.l., Chilly-Mazarin, France

Filed Dec. 9, 1987, Ser. No. 130,400
Claims priority, application France, Dec. 11, 1986, 86 17363
Int. Cl.[4] A24B *7/14*
U.S. Cl. 131—108 **10 Claims**



1. Apparatus for transporting and treating particles of tobacco and analogous fibrous material in a rod making machine of the tobacco processing industry, comprising a duct having an air admitting first inlet, an air outlet remote from said inlet, and a second inlet intermediate said first inlet and said outlet; means for evacuating air from said duct by way of said outlet: means for admitting air into said first inlet so that a stream of air flows from said first inlet, past said second inlet and toward said outlet; means for distributing the air stream across the duct in the region of said first inlet, including a rotary impeller extending substantially transversely of the direction of flow of

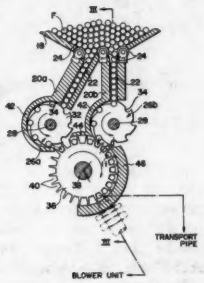
the air stream from said first inlet toward said outlet; and means for feeding into said duct by way of said second inlet fibrous material containing lighter and heavier components so that the stream entrains at least the lighter components from said second inlet to said outlet.

4,883,078

TRANSPORT SYSTEM FOR TRANSPORTING ROD-SHAPED OBJECTS IN AN AIR FLOW

Ichiro Hirose, Tokyo; Takayoshi Sagawa, Hiratsuka; Shichisei Tani, Hiratsuka, and Katsuo Kato, Hiratsuka, all of Japan, assignors to Japan Tobacco Inc., Tokyo, Japan

Filed Sep. 23, 1986, Ser. No. 910,667
Int. Cl.[4] A24C *5/00, 5/62*
U.S. Cl. 131—280 7 Claims



1. A transport system for transporting rod-shaped objects in an air flow, comprising:

a feeder unit for successively delivering the rod-shaped objects;

a transport pipe connected, at one end, to the feeder unit, and capable of successively receiving the rod-shaped objects from the feeder unit, and transporting the objects therein;

a blower unit for supplying compressed air to the transport pipe, through the one end thereof, so that the rod-shaped objects therein are transported toward the other end side of the transport pipe, by the flow of compressed air,

the blower unit including a compressed-air source connected to the one end of the transport pipe, and adapted to supply the compressed air, and control means provided between the compressed-air source and the one end of the transport pipe, whereby the flow rate of compressed air supplied thereto is controlled;

a receiving unit connected to the other end of the transport pipe, whereby the rod-shaped objects transported through the transport pipe are received;

detecting means disposed in an path for the rod-shaped objects, extending from the feeder unit into the receiving unit, and adapted to detect any jamming of the objects and, if so, to deliver a jam signal;

a control circuit adapted to stop the operation of the feeder unit and the receiving unit immediately when the jam signal is delivered from the detecting means, and to stop the operation of the blower unit after a predetermined delay, following delivery of the jam signal; and

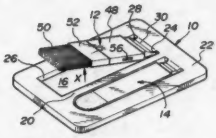
pressure relief means, in the transport pipe, for releasing the compressed air into the atmosphere, the pressure relief means being adapted to be actuated when the jam signal is delivered from the detecting means.

4,883,079

MAKE-UP TOOL AND HOLDER ASSEMBLY

Yosio Sakamaki, Nagareyama; Yuji Ideshita, Yokohama; Fumiyoshi Fujita, Soka, and Takashi Sugiyama, Kodaira, all of Japan, assignors to Yoshida Industry Co., Ltd., Tokyo, Japan

Filed Mar. 1, 1988, Ser. No. 162,709
Claims priority, application Japan, Sep. 18, 1987, 62-141577; Sep. 18, 1987, 62-141578; Sep. 18, 1987, 62-141579; Oct. 15, 1987, 62-156791; Oct. 15, 1987, 62-156792
Int. Cl.[4] A45D *40/24*
U.S. Cl. 132—318 6 Claims



1. A make-up tool and holder assembly comprising:

a holder body substantially in the shape of a plate;

a plurality of cavities formed in said holder body through the entire thickness thereof, each said cavity being entirely surrounded by marginal walls of said holder body;

a plurality of tools each having at one end thereof a make-up head, each said tool having a dimension capable of being accommodated in a respective said cavity; and

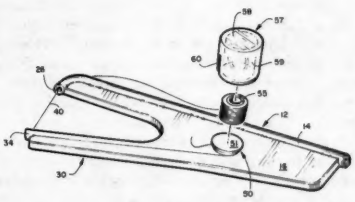
means for securing each said tool in the respective said cavity in a detachable manner, said securing means including a slot formed in said tool at an end thereof opposite to said head, a plug member formed on a respective said marginal wall defining said cavity and adapted to fit in said slot, and a flexible hinge portion for permitting at least a part of said tool including said head to project over said holder body.

4,883,080

COMBINATION NOZZLE AND DENTAL FLOSS ASSEMBLY FOR ORAL HYGIENE FLUSHING APPARATUS

Dennis R. Lang, 12905 Mapleview St. Apt. 5-145, Lakeside, Calif. 92040

Filed Aug. 5, 1988, Ser. No. 228,494
Int. Cl.[4] A61C *15/00*
U.S. Cl. 132—322 7 Claims



1. A combination nozzle and dental floss assembly for oral hygiene flushing apparatus comprising:

an elongated nozzle having an inlet port and an outlet port formed in its respective opposite ends: and

a finger member having a bottom end and said bottom end is connected to said nozzle, said finger member having a tip that is spaced a predetermined distance from the outlet port of said nozzle; and

means for detachably stringing a predetermined length of

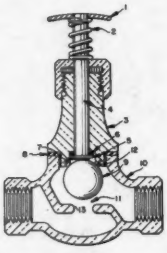
dental floss between the tip of said finger member end and the outlet port of said elongated nozzle.

4,883,081

FLOW AND SEISMIC SENSITIVE SAFETY VALVE FOR GASEOUS FLUIDS

Antone W. Morris, P.O. Box 208, Point Reyes, Calif. 94956

Filed Apr. 6, 1989, Ser. No. 334,172
Int. Cl.[4] F16K *17/36*
U.S. Cl. 137—39 **6 Claims**



1. A flow and shock sensitive self-closing safety valve for a gas pipeline comprising:

a valve body of a non-magnetic material having inlet and outlet flow passageways and an annular, generally horizontal valve seat between them;

a valve element of a magnetic material above said valve seat;

a permanent magnet in said valve body above said valve element and movable therein toward and away from said valve seat to adjust the magnetic attraction between said magnet and said valve element; and

spring means biasing said magnet away from said valve element, said spring means being overcome to enable movement of said magnet to engage said valve while on said valve seat.

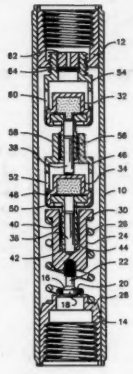
4,883,082

TEMPERATURE-RESPONSIVE VALVE

Fred L. Pirkle, Box 27, Oreland, Pa. 19075

Continuation-in-part of Ser. No. 194,164, May 16, 1988, Pat. No. 4,815,491. This application Mar. 27, 1989, Ser. No. 328,858
Int. Cl.[4] F16K *31/64, 17/40;* E03B *7/12*
U.S. Cl. 137—62 **6 Claims**

1. A temperature-responsive valve comprising means providing first and second ports with a flow path extending therebetween, means comprising a valve element for closing said flow path, and temperature-responsive means, comprising first and second temperature-sensitive expansible actuators connected in series with each other and set to expand at different temperatures, for causing said valve element to open said flow path when one of said actuators expands, and also causing said valve element to open said flow path when the other of said actuators contracts, said actuators having a stable condition in an intermediate range of temperatures between said different temperatures, said flow path having an orifice, said temperature-responsive means including means, connected to said valve element and responsive to expansion and contraction of said actuators, for causing said valve element to move through said orifice from one side thereof to the other, and said actuators and valve element being arranged so that said valve element is located on one side of said orifice, when said one of said actuators expands, to permit fluid flow in said flow path, so that said valve element is located on the opposite side of said orifice, when other of said actuators contracts, to permit fluid flow in said flow path, and so that said valve element is located in said orifice to shut off flow in said flow path when said one



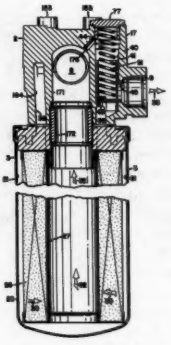
of said actuators is contracted and said other of said actuators is expanded.

4,883,083

RELIEF VALVE ASSEMBLY; PISTON MEMBER FROM SAME AND FILTER HEAD ASSEMBLY INCORPORATING SAME

Patrick Fisher; Jack Stifelman, both of Bloomington; John F. Connelly, Minnetonka; Jeff J. Theisen, Prior Lake, all of Minn., and Patrick Fisher, Blooomington, all of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Continuation of Ser. No. 46,903, May 5, 1987, abandoned. This application Dec. 29, 1988, Ser. No. 292,644
Int. Cl.[4] B01D *29/36*
U.S. Cl. 137—110 **17 Claims**



1. A relief valve assembly comprising:

(a) a valve body;

(i) said valve body defining an elongate valve chamber having a longitudinal axis and a lateral fluid takeoff aperture;

(b) a valve piston member slideably positioned in said valve chamber for selected movement along said longitudinal axis to selectively permit substantial fluid flow communication outwardly from said valve body and through said lateral fluid takeoff aperture; and

(c) lateral pressure relief means constructed and arranged to stabilize said valve piston member with respect to poten-

tial lateral pressures acting thereon due to a relatively low pressure at said lateral fluid takeoff aperture;

(d) whereby a tendency for said valve piston member to deviate laterally from smooth sliding movement along said longitudinal axis, and toward said lateral fluid takeoff aperture, due to relatively low pressure at said takeoff aperture, may be substantially alleviated.

4,883,084

PRESSURE FLUID CONTROL SYSTEM

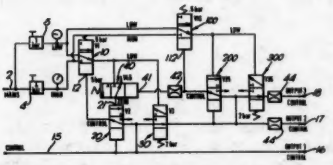
David T. Walter, Milton Keynes, England, assignor to TI Interlock Limited, Bedford, England

Filed Jul. 20, 1988, Ser. No. 221,855

Claims priority, application United Kingdom, Jul. 21, 1987, 8717169

Int. Cl.[4] F16K *31/36*

U.S. Cl. 137—118 **10 Claims**



6. A fluid pressure control system in a pressure fluid circuit comprising: first, second and third comparator valves, said first and third comparator valves each having a comparison port opposed by a fixed bias, said second comparator valve having two comparison ports; first, second and third sources respectively of fluid at a higher reference pressure, fluid at a lower reference pressure and fluid at a condition responsive variable pressure; and a system outlet for said fluid from said third source, said first comparator valve having first and second positions respectively connecting said first and said second source with a comparison port of said second comparator valve and with said comparison port of said third comparator valve, said second comparator valve having a first position when said first comparator valve is in the first position thereof connecting said comparison port of said first comparator valve with zero pressure, and a second position when said first comparator valve is in the second position thereof connecting said comparison port with said third source, and said third comparator valve having a first position when said first and second comparator valves are in the first positions thereof connecting said system outlet to zero pressure and a second position when said first and second comparator valves are in the second positions thereof connecting said system outlet to said third source.

4,883,085

METHOD OF INSTALLING A STOPPER IN A FITTING AND APPARATUS THEREFOR

Michael E. Weller, House Springs, Mo., and Joseph L. Daghe, Decatur, Ill., assignors to Mueller Company, Decatur, Ill.

Filed Sep. 15, 1988, Ser. No. 244,297

Int. Cl.[4] F16K *43/00*; F16L *55/12*

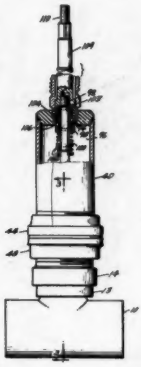
U.S. Cl. 137—315 **16 Claims**

8. An improved line stopping apparatus for use in a plastic fitting and control linkage therefor which is powered by an external drive shaft, comprising:

a stopper shaft having a second threaded portion formed at a lower end thereof and threaded in a fourth direction, a first threaded portion above said second threaded portion and threaded in a third direction that is opposite the fourth direction, and a threaded nipple portion at an upper end thereof that is threaded in a first direction so as to be adapted to engage a threaded bore in the drive shaft;

a lock nut mounted on said stopper shaft beneath said nipple and having an outer threaded portion which is threaded in a second direction opposite the first direction so as to be adapted to engage an inner threaded portion provided within a flange on the drive shaft;

means for releasably locking said stopper shaft against rotation with respect to said lock nut, whereby torque in either direction between the drive shaft and the stopper shaft will cause one of the threaded connections to tighten and the threaded portions may be disassembled by disengaging the locking means when the locking means is pushed away from the lock nut to permit the drive shaft to be unscrewed and removed from the stopper shaft;



a stopper element adapted to be inserted into the plastic fitting for bearing against the inside thereof to impede the flow of fluid therethrough;

said stopper element having a first threaded collar threadedly engaged with said first threaded portion;

a second threaded collar threadedly engaged with said second threaded portion;

first and second draw bar linkages pivotally attached to said first and second collars, respectively, at first ends thereof, and to said stopper element at second ends thereof, whereby, upon rotation of the stopper shaft the stopper element moves relative to the fitting to impede the flow of fluid therethrough.

4,883,086

ASPIRATION CHEMICAL SUPPLY APPARATUS AND METHOD

Emil A. Lejnar, 201 S. Lake Dr., Lehigh Acres, Fla. 33936

Filed Oct. 26, 1988, Ser. No. 263,201

Int. Cl.[4] B01F *5/04*

U.S. Cl. 137—399 **19 Claims**

1. A liquid chemical supply device for use with a liquid distribution system comprising:

storing means for storing chemical supply;

transfer means attached to said storing means for transferring chemicals out of said storing means;

control means attached to said transfer means for controlling liquid flow from said transfer means;

connecting means adjacent to said control means for carrying chemicals from said control means to the liquid distribution system;

attaching means on said connecting means for attaching said connecting means to the liquid distribution system;

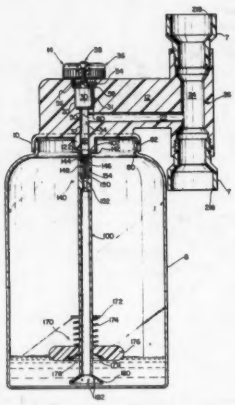
suction means in said attaching means for creating suction in said connecting means and transfer means;

prevention means in said transfer means for preventing liquid in the distribution system from flowing into said storing means;

stopping means on said transfer means for automatically stopping liquid flow from said storing means into said transfer means when chemical supply in said storing means reaches a predetermined level;

wherein said storing means comprises a closed container with a top and an opposed bottom, said closed container having an opening defined by a lid at said top of said container, said container defining a reservoir interior for holding a supply of liquid chemicals;

wherein said transfer means comprises an elongated hollow tube having one end attached to said control means and the other end terminating at the bottom of said storing means; and



wherein said other end of said tube includes a closure portion closing off said other end from the passage of said chemical supply, and at least one opening defined along the cylindrical periphery of tube near said other end, and wherein said stopping means comprises a float means movably mounted to said tube, and an elongated spring means fixedly mounted to said tube, said spring for normally urging said float means in a first direction for blocking fluid flow through said at least one opening, said float means operative in a second direction under the urging of said liquid for opening said at least one opening to fluid flow.

4,883,087

CENTRAL HEATING SYSTEM AND WATER SYSTEM AND METHOD FOR CONTROLLING THE TIGHTNESS THEREOF

Inge Nielsen, Odense, Denmark, assignor to I.K. Trading Aps., Odense, Denmark

PCT No. PCT/DK87/00002, § 371 Date Sep. 10, 1987, § 102(e) Date Sep. 10, 1987, PCT Pub. No. WO87/04520, PCT Pub. Date Jul. 30, 1987

PCT Filed Jan. 12, 1987, Ser. No. 100,779

Claims priority, application Denmark, Jan. 17, 1986, 245/86; Jul. 28, 1986, 3587/86

Int. Cl.[4] F16K *17/00*

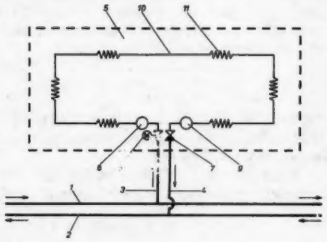
U.S. Cl. 137—458 **22 Claims**

1. A method of controlling water flow in a water system, comprising the steps of:

detecting a leak in the water system based on a comparison between a signal indicative of the water flow and at least one of a predetermined upper and lower limit of allowable water flow;

stopping the water flow in response to the step of detecting if the comparison reveals that the water flow is one of in excess of the upper limit and below the lower limit; and

effecting the steps of detecting and stopping even during an absence of any demand from the water system for water



flow into the water system other than that caused by the leak.

4,883,088

PRESSURE REGULATING APPARATUS

Kurt Herbst, Burgstetten, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

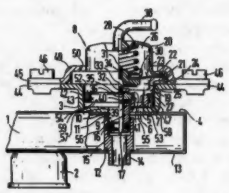
Continuation-in-part of Ser. No. 931,811, Nov. 18, 1986, Pat. No. 4,741,315. This application Apr. 6, 1988, Ser. No. 178,419

Claims priority, application Fed. Rep. of Germany, May 15, 1987, 3716316

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[4] F02M *39/00*

U.S. Cl. 137—510 **2 Claims**



1. A pressure regulating apparatus having a pressure regulating valve, disposed on and connected to a rigid fuel distributor line for supplying fuel to fuel injection valves of a fuel injection system for internal combustion engines, the regulating valve having a resilient wall that divides a spring chamber from a fuel chamber in the valve housing and arranged to cooperate with a valve seat in the fuel chamber, at least one inflow opening arranged to connect the fuel chamber with the fuel distributor line, and an outlet conduit adapted to lead from the valve seat, via a valve seat body and an outlet connector, to a fuel return line, a cup-shaped holder having a bottom tightly connected to the fuel distributor line, the holder arranged to at least completely encompass the valve housing of the pressure regulating valve in the axial direction and in a region which leads away from the fuel distributor line, an elastic seal disposed in said region, between the valve housing and the holder, in a sealing groove that is defined, remote from the bottom of the holder, in the axial direction by a step of the valve housing, characterized in that on the side of the seal (43) remote from the step (52), the sealing groove (42) is defined axially by a separate ring (58, 61), which is adapted to rest on the bottom (7) of the holder (3).

4,883,089

RAILWAY CAR PRESSURE CONTROL VALVES

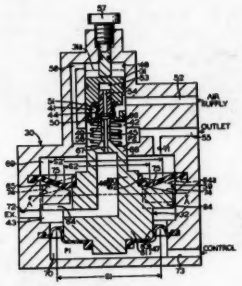
Hideo Tamamori, Kobe, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Dec. 1, 1988, Ser. No. 278,518

Claims priority, application Japan, Dec. 8, 1987, 62-186765[U]

Int. Cl.[4] G05D *16/00*; F16K *31/126*

U.S. Cl. 137—596.18 8 Claims



1. A railway car pressure control valve comprising, an adjustable middle body member having an air supply chamber, an air supply valve and a valve seat, the air supply chamber is connected to a source of compressed air, an output chamber is connected to an output passage, an exhaust chamber is opened to the atmosphere, the valve seat located in an air supply passage connects the air supply chamber to the output chamber, the air supply valve is biased by a spring toward the valve seat, an exhaust valve rod having a valve tip which seats on the air supply valve and fits loosely in the air supply passage and having an exhaust passage which has one end open at the valve tip and which has the other end open to the exhaust chamber, a control piston having a center portion attached to an inner periphery of a control piston diaphragm, the control piston diaphragm having an outer periphery fixed to the inside wall of a valve main body for defining a control chamber, a source of control air pressure connected to the control chamber to provide a pressure force to move the exhaust valve rod in the direction of the air supply valve, a balance piston having a center portion attached to an inner periphery of a balance piston diaphragm, the balance piston diaphragm having an outer periphery fixed to the inside wall of the valve main body for defining a balance chamber which receives the air pressure from the output chamber proving a balancing force to resist the pressure force in the control chamber, a first and second plurality of radially extending fins have upper slanted surfaces which contact the adjacent surface of the balanced piston diaphragm, and the first and second plurality of the radially extending fins have lower slanted surfaces which contact the adjacent surface of the control piston diaphragm.

4,883,090

MIXING BIBCOCK

Yoshiaki Kitamura, and Kinji Goto, both of Yamagata, Japan, assignors to Kitamuragokin Ind. Co., Ltd., Gifu, Japan

Filed Nov. 9, 1987, Ser. No. 117,834

Int. Cl.[4] F16K *11/074*

U.S. Cl. 137—625.41 3 Claims

1. A mixing bibcock having a valve mechanism for individually supplying hot water, cold water, or a mixture thereof at a desired temperature, said mixing bibcock comprising:

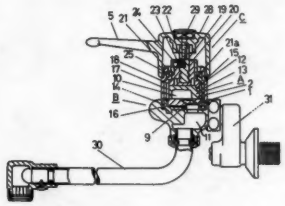
a fixed plate valve having a cold water inlet port, a hot water inlet port, and an outlet port, said ports all extending through said fixed plate valve to connect the top surface thereof to the bottom surface thereof;

a movable plate valve having a recessed water guide groove in the form of a blind hole in one surface thereof;

a main mixing valve body having a valve chamber therein in which said fixed plate valve and said movable plate valve are positioned with the one surface of said movable plate valve abutting one surface of said fixed plate valve and with said recessed water guide groove always in communication with said outlet port in all positions of movement of said movable plate valve on the abutting surface of said fixed plate valve;

an operating means connected to said movable plate valve for reciprocally turning said movable plate valve in a plane on the abutting surface of said fixed plate valve between a middle position which is between said two inlet ports and two end positions on opposite sides of said middle position which are respectively toward said cold water inlet port and said hot water inlet port;

said recessed water guide groove having a first branch ex-



tending generally radially outwardly of said movable plate valve and when said movable plate valve is in said middle position, lying between said inlet ports and being movable toward said inlet ports for gradually uncovering the respective inlet ports as said movable plate valve is moved toward the respective end positions, and having a second branch extending radially of said movable plate valve and at an angle to said first branch which, when said movable plate valve is in said middle position, causes said second branch to be inclined toward said cold water inlet, said second branch having a shape which, when said movable plate valve is moved toward the end position corresponding to the hot water inlet, at first comes into communication with said cold water inlet for mixing cold water with the hot water flowing through said recessed water guide groove and gradually increases the area of communication to a maximum and then gradually decreases the area of communication to a minimum as said first branch uncovers the hot water inlet port.

4,883,091

MULTI-PORT SELF-REGULATING PROPORTIONAL PRESSURE CONTROL VALVE

Charles A. Weiler, Holly, Mich., and Logan H. Mathis, Lavonia, Ga., assignors to Ross Operating Valve Company, Troy, Mich.

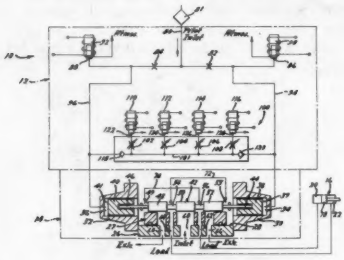
Filed Dec. 27, 1988, Ser. No. 290,745

Int. Cl.[4] F15B *13/043*

U.S. Cl. 137—625.64 20 Claims

1. In a pneumatic fluid control valve apparatus having a working fluid inlet connectable to a source of pressurized pneumatic working fluid, a pair of working fluid load outlets, a movable valve member, and a pilot operator for selectively applying a pneumatic control fluid pressure to the movable valve member in order to communicate a selected one of the load outlets with the working fluid inlet to produce load outlet pressures dependent upon the position of the movable valve member, the improvement wherein the pilot operator includes a pair of control pistons interconnected with opposite sides of the movable valve member, the pilot operator being selectively operable to apply control fluid pressure to a selected one of said control pistons and to exhaust control fluid pressure from

the other of said control pistons in order to cause selective movement of the movable valve member in either of opposite directions, said control valve apparatus including self-regulation means for maintaining the load outlet pressure proportional to the control fluid pressure, said self-regulation means including portions on opposite sides of the movable valve member and feedback means in fluid communication with said valve member portions for applying load outlet pressure from said selected load outlet to one of said valve member portions in order to tend to urge said movable valve member in a direction opposing movement of the movable valve member in a direction that communicates the working fluid inlet with said selected load outlet, the area of each of said control pistons



being greater than the area of each of said valve member portions, the load outlet pressure at said selected load outlet being proportional to the control fluid pressure applied to said one of said control pistons in the same ratio as the ratio of the area of said one of said control pistons to the area of said one of said valve member portions, the pilot operator further including means for selectively applying equal control fluid pressures to both of said control pistons simultaneously in order to maintain the movable valve member in a center-off position with substantially no working fluid flow and substantially no control fluid flow, said self-regulation means also tending to maintain the movable valve member in said center-off position in the event of undesired movement from said center-off position.

4,883,092

MULTI-WAY CONTROL VALVE APPARATUS

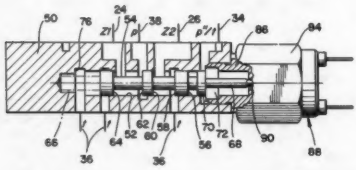
Winfried Rüb, Neustadt/Main, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Filed Sep. 8, 1988, Ser. No. 241,957

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1987, 3731297

Int. Cl.[4] F15B *13/06*

U.S. Cl. 137—625.65 **9 Claims**



1. A control valve apparatus for use in a hydraulic system of a type in which there are at least two working spaces and in which the control valve apparatus enables selective transmission of pressure to each of said working spaces and also selective depressurizing of all of said working spaces simultaneously, said apparatus including a single control valve having a body and control piston means slidable in said body, a restoring device for biasing said control piston means in one direction, a magnetic control device for moving said control piston means to an intermediate control position, and a control pressure system for moving said control piston means against the force of said restoring device.

4,883,093

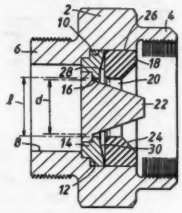
FLUID FLOW CONTROL DEVICE

Peter Miles, Crowthorne, and Leslie A. D. Smith, Newbury, both of England, assignors to Hydro-Tec Limited, Berkshire, England

Filed Dec. 28, 1987, Ser. No. 137,981

Int. Cl.[4] F16K *15/14*; G05D *7/01*

U.S. Cl. 138—45 **13 Claims**



1. A device for controlling fluid flow comprising a chamber having an inlet and an outlet for the fluid and flow control means between the said inlet and outlet; the flow control means comprising a resilient member and a dished support therefor having aligned fluid flow passages therethrough; the said resilient member just fitting within the chamber with a small clearance from the chamber walls, and having a downstream face and an upstream face, the upstream face including a flat outer surface and a chamfered inner surface that is inclined downwardly towards the fluid flow passage in the resilient member; and the support including means projecting through the fluid flow passage in the resilient member with clearance therefrom in the relaxes state of the resilient member, for limiting the inward deformation of the said member without closing said fluid flow passage therethrough.

4,883,094

APPARATUS FOR SEALING PIPE

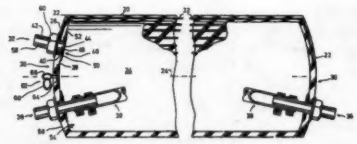
Manfred Vetter, Burg Langendorf, D-5352 Zülpich, Fed. Rep. of Germany

Filed May 11, 1988, Ser. No. 192,828

Claims priority, application Fed. Rep. of Germany, May 11, 1987, 3715645

Int. Cl.[4] F16L *55/12*

U.S. Cl. 138—89 **11 Claims**



1. A pipe sealing pad having

a cylindrical, external sleeve made of reinforced rubber material; and

two end walls made of rubber material and exhibiting an inner surface each;

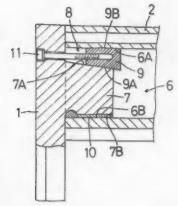
said sleeve and said two end walls are linked together by heat vulcanization and define an air-tight compartment; said air-tight compartment is accessible by means of a connection in form of a pipe fitting inserted in an opening in one of the two end walls, and in the compartment the pipe fitting is linked to a ring disk having an inner area, an outer area, and a ring-shaped compensation zone between said inner area and said outer area, said inner area being linked to the pipe fitting; the ring disk is linked to the said inner surface of the end wall exhibiting the opening only in the said outer area, in the ring shaped compensation zone the ring disk is not linked with either the pipe fitting or the inner surface of the said end wall exhibiting the opening; and the ring disk at least in its ring-shaped compensation zone is made of a material that has a greater elasticity than the material of the end wall exhibiting the opening.

4,883,095

CONNECTING CONSTRUCTION FOR SIDESTAY OF HEALD FRAME AND TRANSVERSE BEAM

Setsu Maruyama, Sakai, and Kiyoshi Takei, Toyonaka, both of Japan, assignors to Maruyama Mfg. Co., Ltd., Sakai, Japan

Filed Dec. 4, 1987, Ser. No. 128,646
Claims priority, application Japan, Oct. 30, 1987, 62-167574
Int. Cl.[4] D03C *9/06*
U.S. Cl. 139—91 **4 Claims**



1. A connecting construction for a sidestay of a heald frame and a transverse beam comprising:

a sidestay of a heald frame;

a transverse beam to be connected via an end face thereof with said sidestay;

a concave engagement space defined in the end face of said transverse beam;

a projecting portion formed integrally with said sidestay to be inserted into said concave engagement space;

securing means for pressingly securing a peripheral wall of said concave engagement space to said projecting portion in a longitudinal direction of said sidestay; wherein said securing means includes:

a wedge-shaped securing member provided at an interspace formed between one of two outer faces of said projecting portion and one of two peripheral wall faces of said concave engagement space, said one outer face of said projecting portion and said one peripheral wall face being opposed to each other in a longitudinal direction of said sidestay, said wedge-shaped securing member having contact faces respectively in contact with said one outer face and said one peripheral wall face, and

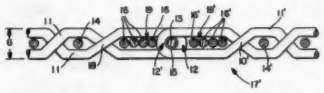
operative means moving said securing member along said transverse beam to secure the sidestay to the transverse beam.

4,883,096

SEAM DESIGN FOR SEAMED FELTS

Patrick H. Penven, Clinton, S.C., assignor to Asten Group, Inc., Charleston, S.C.

Filed May 4, 1988, Ser. No. 190,136
Int. Cl.[4] D03D *3/04*
U.S. Cl. 139—383 A **3 Claims**



1. A seam construction for closing an open papermaker's fabric having a plurality of machine direction yarns interwoven with a plurality of cross machine direction yarns in a repeated pattern throughout the fabric length with each end of the fabric terminated with a plurality of machine direction loops, said seem construction comprised of:

each of said plurality of machine direction loops having a free end defined by a continuous arcuate portion of the machine direction yarn and a fixed end defined by an adjacent crossing portion of the said machine direction yarn as interwoven in the repeated pattern, said arcuate portion defining a vertical plane which is substantially perpendicular to the horizontal plane defined by said cross machine direction yarns;

said machine direction loops at each end of said fabric intermeshed to define a cross machine direction pintle channel, each of said loops having an internal aperture which has a longitudinal dimension equal to at least three times the average longitudinal dimension of the cross machine direction yarns and a vertical dimension no greater than the largest vertical dimension of a cross machine direction yarn;

a pintle in said pintle channel such that a cross machine direction stuffer channel is formed through the loops of at least one end of the fabric between the crossing segments of those loops and the free ends of the loops of the other fabric end which is at least the diameter of one cross machine direction yarn; and

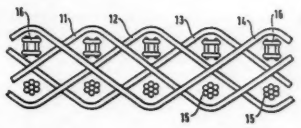
at least one cross machine direction stuffer positioned within said cross machine direction stuffer channel.

4,883,097

PAPERMAKERS WET FELTS

Marcel Dufour, Sryrieix, France, assignor to Asten Group, Inc., Charleston, S.C.

Continuation of Ser. No. 357,014, Mar. 11, 1982. This application Sep. 4, 1986, Ser. No. 904,028
Claims priority, application France, Mar. 11, 1981, 81 04839
Int. Cl.[4] D21F *7/08*; D03D *1/00*
U.S. Cl. 139—383 A **9 Claims**



1. A shock absorbing, vibration suppressing fabric for transporting a paper sheet in a papermaking machine having at least one roller nip through which the paper sheet must be transported, said fabric having at least two systems of yarns interwoven in a repeat pattern with at least one of said systems having compressible knitted yarns interwoven with at least one of said systems having longitudinally extending incompressible yarns, said compressible yarns being under less tension than

said monofilament yarns so that the entire fabric is compressible and has a thickness limit EL which is defined by the equation EL=eF+ee+ef, wherein eF is the theoretical thickness reduced to a homogeneous unit, ee is the thickness corresponding to the quantity of water carried by the fabric and ef corresponds to the thickness of the paper sheet.

4,883,098

PROJECTILE OPENER AND LIFT FOR A PROJECTILE LOOM

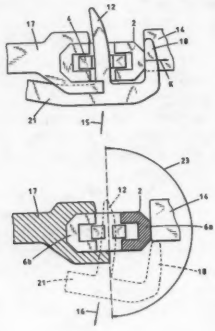
Erwin Pfarrwaller, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Oct. 26, 1988, Ser. No. 262,900

Claims priority, application Switzerland, Nov. 20, 1987, 04516/87

Int. Cl.[4] D03D *47/24, 47/27;* D03J *5/06*

U.S. Cl. 139—439 **16 Claims**



1. In a projectile loom, the combination comprising a projectile lift for pivoting and positioning a projectile into a ready-to-pick position, said lift having a guide profile cross-section open on a striking side of the projectile; and

a projectile opener pivotal with said lift to open a gripper in the projectile said opener including a guide element for engaging a guide surface of the projectile during pivoting of the projectile into said ready-to-pick position.

4,883,099

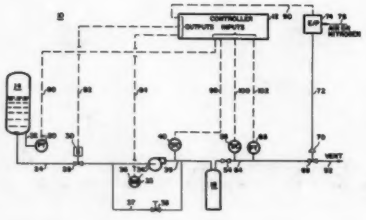
METHOD AND SYSTEM FOR FILLING LIQUID CYLINDERS

James Vanommeren, R.D. #2, Box 254-8, New Tripoli, Pa. 18066

Filed Jul. 22, 1986, Ser. No. 888,655

Int. Cl.[4] B67C *3/32*

U.S. Cl. 141—1 **15 Claims**



1. A method for minimizing cryogenic substance loss in a filling station having a storage tank storing cyrogenic substance for loading a container having an outlet vent with a throttle vent valve for adjusting the differential pressure between the substance being loaded and the container, comprising the steps of:

(a) first determining a value of filling loss for each of a plurality of values of differential pressure;

(b) selecting and storing prior to loading an optimum value of differential pressure from the plurality of values to produce the minimum filling loss;

(c) loading substance into a container;

(d) continuously monitoring the differential pressure during loading;

(e) comparing the monitored differential pressure to the optimum differential pressure; and

(f) adjusting the throttle vent valve to maintain the monitored differential pressure at a value substantially equal to the optimum differential pressure value.

4,883,100

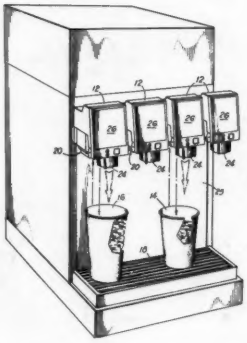
AUTOMATIC CONTROL SYSTEM FOR FILLING BEVERAGE CONTAINERS

William F. Stembridge, 618 Camelot Dr., College Park, Ga. 30349; James C. Sturrock, Rte. 1, Box 389, Espanola, N. Mex. 87532, and W. Frank Stembridge, 1821 Farris St., East Point, Ga. 30344

Division of Ser. No. 48,111, May 8, 1987, which is a continuation-in-part of Ser. No. 684,215, Dec. 20, 1984, abandoned, which is a continuation-in-part of Ser. No. 629,397, Jul. 10, 1984, abandoned. This application Nov. 30, 1987, Ser. No. 128,117

Int. Cl.[4] B65B *57/14;* G01F *23/00*

U.S. Cl. 141—1 **26 Claims**



1. An apparatus for automatically filling a container with a beverage comprising:

(a) a beverage dispenser including a beverage dispensing nozzle located above a container supporting grate;

(b) a pair of ultrasonic energy transmitters mounted on said dispenser for transmitting ultrasonic energy down toward said container supporting grate located below said beverage dispensing nozzle;

(c) a pair of ultrasonic energy receivers mounted on said dispenser, separate from and spaced apart from said transmitters and positioned for receiving ultrasonic energy reflected back up from the direction of said grate and from generating signals corresponding to the travel time of the ultrasonic energy;

(d) control circuit means using said generated signals for automatically detecting the presence of any container placed on said grate and below said nozzle; and

(e) said control circuit means including means using said generated signals for controlling the filling of any con-

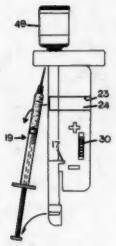
tainer placed on said grate with beverage from said nozzle.

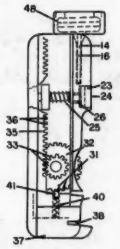
4,883,101

FILLING DEVICE WITH SOUND INDICATOR FOR FILLING INJECTION SYRINGE

Bernard Strong, Tarzana, Calif., assignor to Jordan Enterprises, Garden Grove, Calif.

Filed Jun. 27, 1988, Ser. No. 212,210
Int. Cl.[4] B65B *3/32*
U.S. Cl. 141—27 **8 Claims**





1. A filling device for a syringe, including barrel and stem portions, comprising a case portion, and including:

i. movable holding means for releasably securing the stem portion of the syringe, and adapted to load or unload the syringe by movement of the stem portion;

ii. a linear gear, including gear teeth attached to the holding means, and adapted to move the holding means;

iii. a rotatable gear mounted by the case portion, the rotatable gear defining manually actuable gear teeth, the rotatable gear including gear teeth for engaging and actuating the gear teeth of the linear gear;

iv. a sounding element adapted to be biased against the manually actuable gear teeth of the rotatable gear; and,

v. a locking arm mounted on the filling device and adapted to secure the syringe against movement when the syringe stem is moved to load or unload the syringe, the locking arm being adapted to release the syringe after loading; and, means for detachably mounting to the filling device a bottle containing liquid medicine for loading or unloading by the syringe; whereby:

vi. movement of the linear gear in one direction causes the holding means to load the syringe with liquid medicine from the medicine bottle, and movement of the linear gear in an opposite direction causes the syringe to unload liquid medicine into the bottle; and,

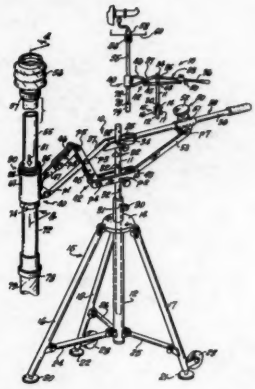
vii. manual movement of the rotatable gear produces a sound from the sounding element due to contact with an individual gear tooth of the manually actuable gear teeth which coincides with an increment of movement of the rotatable gear, each sound being equivalent to a predetermine amount of liquid medicine loaded by the syringe.

4,883,102

DRAIN LINE APPARATUS

Mher Gabrielyan, 5921 Fountain Ave., Los Angeles, Calif. 90028, and John R. Brestel, Sepulveda, Calif., assignors to Mher Gabrielyan, Hollywood, Calif.

Filed Feb. 18, 1987, Ser. No. 16,127
Int. Cl.[4] B65B *3/04*
U.S. Cl. 141—98 **21 Claims**



1. A drainage apparatus comprising

a stand mast,

means for supporting said stand mast on a working surface,

first-class lever means having a fulcrum and including a load arm and an effort arm fulcrumed on said stand mast,

funneling means pivotally attached to said effort arm,

means fulcrumed on said stand mast and pivotally attached to said funneling means for maintaining in drainage orientation said funneling means during operation of said lever means, and

means for locking said funneling means in a fixed position after operation of said lever means,

said maintaining means being fulcrumed on said stand mast below the fulcrum for said lever means.

4,883,103

FILLER NECK SEALING ASSEMBLY

Emil Szlaga; Robert S. Harris, and Robert H. Thompson, all of Connersville, Ind., assignors to Stant Inc., Connersville, Ind.

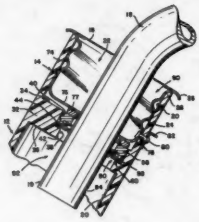
Continuation-in-part of Ser. No. 106,632, Oct. 8, 1987, Pat. No. 4,816,045, which is a continuation-in-part of Ser. No. 846,081, Mar. 31, 1986, Pat. No. 4,707,164. This application Jan. 25, 1988, Ser. No. 148,384
Int. Cl.[4] B67D *5/04*
U.S. Cl. 141—368 **6 Claims**

1. A system for communicating fuel from a fuel-dispensing nozzle to a fuel tank, the system comprising:

a filler neck having an inner wall defining a nozzle-receiving passageway having a mouth, and

means for dividing the nozzle-receiving passageway into an outer chamber communicable with the atmosphere through the mouth and an inner chamber in fluid communication with the fuel tank, the dividing means including establishing means for forming a liquid fuel and fuel vapor seal to block flow of liquid fuel and fuel vapor through any space between the inner wall of the filler neck and a fuel-dispensing nozzle inserted into the inner chamber through the filler neck mouth so that the fuel dispensing nozzle is admitted into the inner chamber without cou-

pling the inner and outer chambers in fluid communication, the establishing means including an annular seal member having a radially outer perimeter sealingly engaging the inner wall of the filler neck and a circular radially inner perimeter configured to define aperture means for sealingly engaging a fuel-dispensing nozzle received therein, the annular seal member being made of a resilient material and including forward and rearward faces extending between the radially inner and outer perimeters the inner and outer perimeters of the seal moveable inde-



pendently of each other, and the establishing means further including a first mounting ring abutting the forward face, a second mounting ring abutting the rearward face, and means extending through said resilient material for permanently interconnecting the first and second mounting rings to one another in fixed spaced-apart relation to capture the annular seal member in a permanently fixed position therebetween so that said annular sealing ring and interconnected mounting rings cooperate to define a subassembly mountable in the dividing means to provide a nozzle-sealing apparatus in a filler neck.

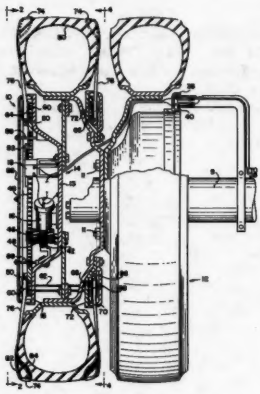
4,883,104

STUDDED TIRE APPARATUS

Tomiji Minami, 59, Suwa 2-chome, Toyokawa 422, Japan

Filed Jun. 16, 1988, Ser. No. 206,703
Int. Cl.[4] B60C *11/00*
U.S. Cl. 152—210 **5 Claims**

2. A studded tire apparatus comprising a wheel adapted to be rotatably mounted on a vehicle, a tire mounted on said wheel, said tire having a plurality of angularly spaced pairs of passages forming holes on opposite sides of said tire leading to the outer peripheral surface thereof, a belt extending movably through each of said pairs of passages, a stud fastened to each of said belts and movable with the associated belt between projected and retracted positions, gear means mounted on said wheel and connected with said belts for moving said belts and



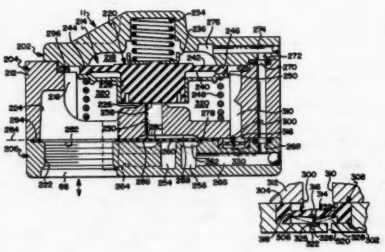
said studs between said positions, and an electric motor connected to said gear means for operating said gear means.

4,883,105

WHEEL END VALVE FOR CENTRAL TIRE INFLATION SYSTEM

Gary R. Schultz, Kalamazoo, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Sep. 12, 1988, Ser. No. 243,003
Int. Cl.[4] B60C *29/00*
U.S. Cl. 152—416 **2 Claims**



1. A wheel end valve assembly for a central tire inflation system comprising a valve body having a first fluid connection defined by a first port for connection to a selectively pressurized and exhausted conduit, a second fluid connection defined by a second port for connection to an interior pressurized chamber of an inflatable tire, said valve assembly comprising first valve means responsive to pressurization of said selectively pressurized and exhausted conduit to assume a first position for establishing fluid communication between said first and second ports and responsive to exhausting to atmosphere of said selectively pressurized and exhausted conduit to assume a second position for blocking fluid communication between said first and second ports thereof, said first valve means comprising a valve member having a first surface exposed to fluid pressure at said first port and an opposed second larger surface, said valve assembly comprising a second valve means constantly in fluid communication with said second port and responsive to a sensed pressurization of said interior chamber of said tire being less than a predetermined minimum refer-

ence pressure and an isolation circuit to conduct fluid from said first port past said second valve means to said second larger surface to maintain said first valve means in said second position thereof in response to said pressurization of said tire being less than said mimimum reference pressure, said assembly characterized by:

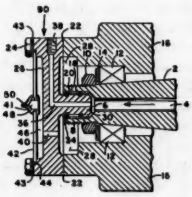
a normally opened third valve means in fluid communication with said first port and said isolation circuit, said third valve comprising an elastomeric disc shaped diaphragm having peripheral sealing means and a fixed post, an orifice formed in said diaphragm into which said post extends to thereby maintain a zero reference pressure differential between said first port and said second larger surface, said third valve being responsive to a rapid increase in pressure at said first port to flex said diaphragm causing said post to close said orifice and thereby permit said first valve means to open.

4,883,106

ROTARY WHEEL-END ASSEMBLY FOR TIRE INFLATION SYSTEM

Gary R. Schultz, and Dale L. Kwasniewski, both of Kalamazoo, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jan. 19, 1989, Ser. No. 299,926
Int. Cl.[4] B60C *29/00*
U.S. Cl. 152—417 **10 Claims**



1. A rotary wheel-end assembly for a central tire fluid inflation system, said assembly securable to an annular surface of a wheel hub journaled for rotation on a non-rotating axle having an open-ended bore in the end thereof in fluid communication with the central inflation system, said assembly comprising;

a disc-like member securable to the wheel hub annular surface and, upon securement thereto, defining a first chamber between the wheel hub and a surface of said disc-like member within the annular surface facing theretowards,

a projection extending from the disc-like member into the axle bore and adapted to enable rotary movement of the assembly relative thereto upon rotation of the wheel hub,

means for sealing against fluid leakage between a radially inner axle surface surrounding said bore and a radially outer surface of the projection disposed therewithin whilst enabling rotary movement of the assembly relative thereto,

a passageway extending through the projection axially and the disc-like member and operative to convey the fluid received from the axle bore therethrough to an outlet port thereof adapted to enable the fluid to be conveyed from the assembly to the tire, and

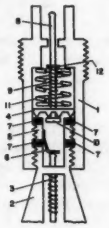
said first chamber operative to hold a lubricant therein for lubricating the projection to lessen rotational friction between the rotary assembly and the axle.

4,883,107

AIR INLET AND AUTOMATIC PRESSURE ADJUSTMENT DEVICE FOR A TIRE

Kenneth B. Keys, Rte. 13, Box 9502, Leander, Tex. 78641

Filed Dec. 4, 1987, Ser. No. 128,909
Int. Cl.[4] B60C *29/00, 23/00*
U.S. Cl. 152—431 **2 Claims**



1. An assembly to allow air filling and automatic pressure adjustment of a tire comprising:

(a) a housing means with an externally threaded upper end

(b) an adjustable loading spring contained in said housing means

(c) a secondary valve held down by said adjustable loading spring

(d) a primary valve with a stem extending through the top of said housing means and through said secondary valve

(e) a seat in said secondary valve to seat said primary valve

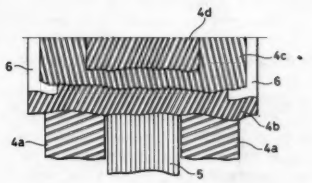
(f) a return spring around said stem of said primary valve that urges said primary valve to seat in said secondary valve, and (g) wherein said housing means is a cap containing an internal collar threaded externally under said secondary valve with said collar containing a depessor spring to open a valve core valve in a valve stem and further serving the purpose of adjusting said adjustable loading spring.

4,883,108

HEAVY-DUTY PNEUMATIC RADIAL TIRE

Ken Takahashi, Atsugi, and Kazuyuki Kabe, Tokyo, both of Japan, assignors to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Sep. 23, 1988, Ser. No. 248,528
Claims priority, application Japan, Sep. 24, 1987, 62-237086
Int. Cl.[4] B60C *9/20, 9/28*
U.S. Cl. 152—531 **10 Claims**



1. A heavy-duty radial tire comprising a carcass layer, a tread, and a belt layer provided between said carcass layer and said tread, said belt layer comprising at least four metallic cord layers of first, second, third, and fourth belts in that order from said carcass layer towards said tread, wherein said first belt has a cord angle of 40° to 75° relative to the circumferential direction of the tire and is split into left and right portions so as to provide a space in the central region of a crown portion, said left and right portions being provided on left and right shoul-

der portions, respectively; said space is provided with at least one organic fiber cord layer having a total tensile strength per unit width of at least 240 kgf/cm and a cord angle of 0° to 10° relative to the circumferential direction of the tire; said second belt comprises cords provided at a cord angle of 22° to 30° relative to the circumferential direction of the tire; said third belt comprises cords crossing said cords constituting said second belt and provided at a cord angle of 10° to 16° relative to the circumferential direction of the tire; and said fourth belt comprises cords provided at a cord angle of at least 18° relative to the circumferential direction of the tire.

4,883,109

ROLLER BLIND FOR SKYLIGHTS

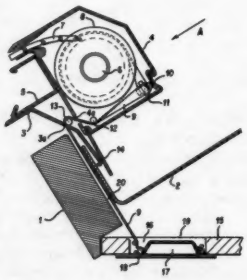
Svend A. Sonderby, Videbaek, Denmark, assignor to V. Kann Rasmussen Industri A/s, Soborg, Denmark

Filed May 23, 1988, Ser. No. 197,705

Claims priority, application Fed. Rep. of Germany, May 26, 1987, 3717681

Int. Cl.[4] E04F *10/08*; E06B *9/26*

U.S. Cl. 160—32 **14 Claims**



1. A roller blind for use with skylights mounted on a roof, said roller blind having a frame upper piece, an outer covering, a roller blind compartment which can be fitted on the upper part of the blind, a winding shaft rotatably mounted in the compartment and a strap drum coaxially connected to the winding shaft for a pulling strap leading to the inside of the room and connected if necessary to a strap winder, wherein there are arranged

(a) in the roller blind compartment (4) at least a first strap deflecting element (10) for deflection of the pulling strap (9) leaving the strap drum (8) into a direction substantially parallel to the winding shaft (6), and

(b) at least a second strap deflecting element (11) for further deflection of the pulling strap (9) into a direction substantially parallel to the central plane of the strap drum (8), and

(c) at least a third strap deflecting element (13) is provided for deflection of the pulling strap (9) into a direction running outward from the window substantially perpendicular to the exit plane of the roller blind (7) from the roller blind compartment (4), said strap deflecting element (13) being mounted on the roller blind compartment (4) spaced from said first strap deflecting element to a point proximate to the frame upper piece (1) so that the pulling strap (9) can, in the installed position, be led inward through a strap opening (3a), made in said outer covering (3) of a frame upper piece (1), said pulling strap being located between said frame upper piece (1) and a cover part (2) said cover part being partially disposed between said outer covering (3) and said frame upper piece thereby avoiding passing of the strap through the roof and the inherent sealing problems associated therewith.

4,883,110

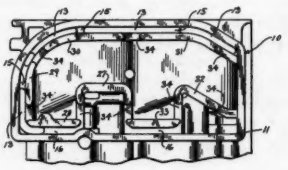
EVAPORABLE FOAM PATTERN FOR USE IN A CASTING PROCESS AND HAVING LOAD TRANSFER WALLS

Edward J. Morgan, North Fond du Lac, and William D. Corbett, Fonde du Lac, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Oct. 26, 1988, Ser. No. 263,006

Int. Cl.[4] B22C *7/02*

U.S. Cl. 164—249 **11 Claims**



6. An evaporable foam engine block pattern, comprising an evaporable foam cylinder block pattern section having an outer peripheral rim and an internal wall spaced inwardly from said rim to provide a water passage therebetween, said cylinder block section having an exhaust manifold passage bordered by said internal wall, an evaporable foam exhaust passage cover section having a rim disposed in abutting relation with the rim of said cylinder block section and having an inwardly facing internal wall disposed in abutting relation with the internal wall of said cylinder block section, the internal wall of said exhaust passage cover section being spaced inwardly of the rim thereon to provide a water passage communicating with the water passage of said cylinder block section, said exhaust passage cover section also having a central portion disposed inwardly of the internal wall and enclosing the exhaust manifold passage, an evaporable foam water passage cover section including a rim disposed in abutting relation with the rim of said exhaust passage cover section, said water passage cover portion including a central portion spaced outwardly of the central portion of the exhaust passage cover section to define a water chamber therebetween, load transmitting means disposed within said water chamber and interconnecting the outer surface of said exhaust passage cover section with the inner surface of said water passage cover section, said load transmitting means being disposed in load transmitting alignment with said abutting internal walls, a layer of adhesive securing the abutting rims together, and a second layer of adhesive joining said abutting internal walls.

4,883,111

INGOT MOULD FOR CONTINUOUS CASTING

Hermann Lax, Düsseldorf; Waldemar Radtke, Oberhausen, and Karl-Heinz Wyrwas, Moers, all of Fed. Rep. of Germany, assignors to Thyssen Stahl Aktiengesellschaft, Duisburg, Fed. Rep. of Germany

Filed Oct. 17, 1988, Ser. No. 258,402

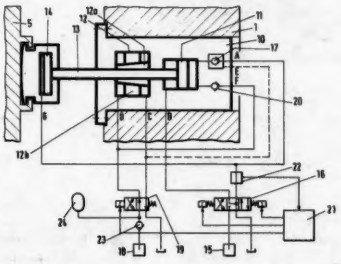
Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735883

Int. Cl.[4] B22D *11/04*

U.S. Cl. 164—436 **9 Claims**

1. An ingot mould for continuous casting, comprising: wide side plates (4, 5), one of which (4) forms a fixed side wall and the other (5) a loose side; adjustable narrow side plates (2, 3) clamped by the wide side plates (4, 5); and adjusting cylinders (8, 9, 11) adjustable to a supporting force for the wide side plate (5) forming the loose side wall, characterized in that in addition

to supporting cylinders (8, 9, 11) the wide side plate (5) forming the loose side wall is supported on supporting elements (12)



which are locked in dependence on a limit value of the pressure operative at the adjusting cylinders (8, 9, 11).

4,883,112

METHOD OF CASTING AND MOLD MAKING

Horst Gravemann, Osnabrueck, Fed. Rep. of Germany, assignor to Kabel-und Metallwerke G. AG, Osnabrueck, Fed. Rep. of Germany

Filed Aug. 5, 1988, Ser. No. 229,214

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3725950

Int. Cl.[4] B22D *11/00*

U.S. Cl. 164—459 **11 Claims**

1. A method of continuous casting comprising providing a continuous casting mold of a copper alloy, said copper alloy including from 0.01% to 0.15% boron, and from 0.01 to 0.2% magnesium, the remainder being copper as well as manufacture-dependent impurities and working additives all percentages by weight.

4,883,113

POURING DEVICE FOR DUAL-ROLL TYPE CONTINUOUS CASTING MACHINE

Kunio Matsui, Yokohama; Hisahiko Fukase, Tokyo; Atsushi Hirata, Hiratsuka, and Akihiro Nomura, Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Japan

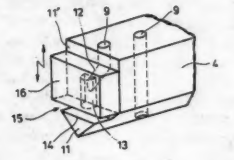
Filed Dec. 5, 1988, Ser. No. 280,139

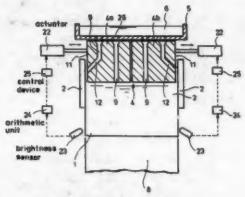
Claims priority, application Japan, Mar. 3, 1988, 63-50017[U]; Mar. 3, 1988, 63-28574

Int. Cl.[4] B22D *11/06*

U.S. Cl. 164—428 **8 Claims**

1. In combination, a pouring device and a pair of parallel cooling rolls for dual-roll type continuous casting machines, wherein a core is supported to be partially submerged in a basin defined by said pair of parallel cooling rolls as well as side dams disposed at both end faces of said cooling rolls, said core being formed with side-dam-wise flow passages at opposite end faces for supplying melt through said core and said opposite end faces of said core in an axial direction of the cooling rolls, an improvement comprising movable means associated with said end faces for controlling, in relation to the





side dams, the flow rate of melt flowing through said side-dam-wise flow passages toward inner surfaces of said side dams.

4,883,114

OSCILLATION METHOD AND APPARATUS FOR A CONTINUOUS CASTING MOLD

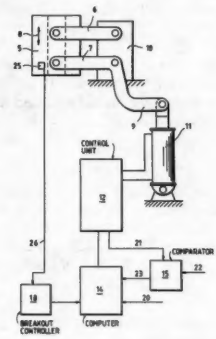
Manfred Wolf, Zurich, Switzerland, assignor to Clecim, Cergy-Pontoise, France; Davy (Distington) Limited, Cumbria, England and Sumitomo Heavy Industries Ltd., Tokyo, Japan

Filed Jan. 24, 1989, Ser. No. 301,605

Claims priority, application Switzerland, Jan. 28, 1988, 00305/88

Int. Cl.[4] B22D *11/04, 11/16*

U.S. Cl. 164—478 **20 Claims**



1. A method for the continuous casting of steel, comprising the steps of forming a continuously cast steel strand in a continuous casting mold, said mold defining a casting passage having an inlet end and an outlet end, and the forming step including admitting molten steel into said inlet end and at least partially solidifying said molten steel in said mold; withdrawing said strand from said passage via said outlet end in a first direction; oscillating said mold by alternately moving the latter in said first direction and in a second direction counter to said first

direction, the oscillating step being performed in such a manner that displacement of said mold varies cyclically with time in a sawtooth-like fashion; and regulating oscillation of said mold so that, during an oscillation cycle, the speed of said mold exceeds the speed of said strand essentially throughout travel of said mold in said first direction and the travel time of said mold in said first direction approximates 0.1 second, the regulating step further being performed in such a manner that the oscillation frequency increases from a value between about 60 and about 120 cycles per minute to a value between about 120 and about 200 cycles per minute as said strand accelerates in a first range of speeds extending from standstill to a predetermined speed between about 0.8 and about 1.2 meter per minute, and the regulating step also being performed such that the oscillation frequency remains substantially constant while the oscillation stroke increases with strand speed as said strand accelerates from said predetermined speed in a second range of speeds.

9. An apparatus for the continuous casting of steel, comprising a continuous casting mold for steel, said mold defining a casting passage having an inlet end for molten steel and an outlet end for a continuously cast steel strand, and said outlet end being spaced from said inlet end in a first direction; a mechanism for oscillating said mold so that the latter alternately moves in said first direction and in a second direction counter to said first direction in a sawtooth-like fashion with time; and means for regulating said mechanism, said regulating means including computer means programmed to effect oscillation of said mold so that, during an oscillation cycle, the speed of said mold exceeds the speed of the strand essentially throughout travel of said mold in said first direction and the travel time of said mold in said first direction approximates 0.1 second, and said computer means further being programmed to increase the oscillation frequency from a value between about 60 and about 120 cycles per minute to a value between about 120 and about 200 cycles per minute as the strand accelerates in a first range of speeds extending from standstill to a predetermined speed between about 0.8 and about 1.2 meter per minute, said computer means also being programmed to maintain the oscillation frequency substantially constant while increasing the oscillation stroke with strand speed as the strand accelerates from said predetermined speed in a second range of speeds, and said regulating means additionally including a comparator for continuously comparing the friction between the strand and said mold with a reference value and continuously transmitting a signal indicative of the difference to said computer means, said computer means being operative to vary the oscillation of said mold in response to said signal so as to minimize friction between the strand and said mold.

4,883,115

METHOD AND APPARATUS FOR COOLING HIGH-TEMPERATURE PROCESSES

Niles W. Johanson; James C. Saeger, both of San Diego, and Mark L. White, San Marcos, all of Calif., assignors to Ogden Environmental Services, Inc., San Diego, Calif.

Filed Sep. 16, 1988, Ser. No. 245,914
Int. Cl.[4] F28D *19/00*
U.S. Cl. 165—1 **20 Claims**

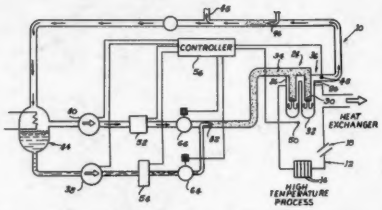
1. A method of controllably cooling a high-temperature process comprising the steps of:

pumping a coolant comprising a mixture of gas and atomized liquid through a heat exchanger to enable heat transfer from said high-temperature process to said coolant in said heat exchanger while maintaining said coolant separate from said process;

measuring the process temperature;

comparing the temperature of said process with a reference temperature; and

varying the flow rate of at least one of said liquid and said gas as necessary to maintain the actual temperature of said process close to said reference temperature while maintaining a coolant flow rate such that said atomized liquid



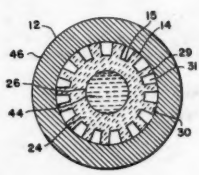
is substantially entirely vaporized and the resulting vapor is at least slightly superheated in said heat exchanger.

4,883,116

CERAMIC HEAT PIPE WICK

Benjamin Seidenberg, Baltimore, and Theodore D. Swanson, Columbia, both of Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 31, 1989, Ser. No. 304,147
Int. Cl.[4] F28D *15/02*
U.S. Cl. 165—104.26 **18 Claims**



1. A wick for inclusion in a capillary loop or heat pipe including a first surface means for contacting a working fluid in a liquid state in said loop, and a second surface means for evaporation of said liquid in said loop, said wick being comprised of a permeable, open-cell, fibrous ceramic foam material.

4,883,117

SWIRL FLOW HEAT EXCHANGER WITH REVERSE SPIRAL CONFIGURATION

Bradley A. Dobbs; David B. Wigmore, both of San Diego, Calif., and Richard E. Niggemann, Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

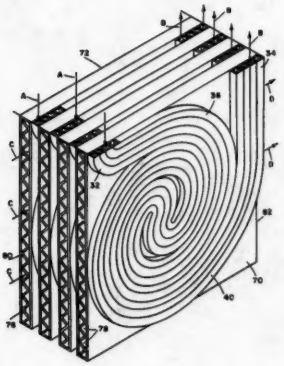
Filed Jul. 20, 1988, Ser. No. 221,803
Int. Cl.[4] F28D *7/02*
U.S. Cl. 165—164 **3 Claims**

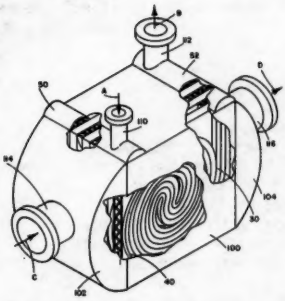
1. A heat exchanger, comprising:

a plurality of first fluid conduit assemblies, each of said first fluid conduit assemblies comprising a first fluid conduit disposed in a first generally planar region and having a first end and a second end, a first portion of said first fluid conduit extending in an inward spiral from said first end to a first area of said first generally planar region, a second portion of said first fluid conduit being connected in fluid communication with said first portion of said first fluid conduit and extending in an outward spiral form said first area of said first generally planar region toward sai second end of said first fluid conduit, said inward spiral extending in a rotational direction opposite to the rotational direction of said outward spiral, said second end of said first fluid conduit being connected in fluid communication

with said second portion of said first fluid conduit, said first end of said first fluid conduit being connected in fluid communication with said first portion of said first fluid conduit, both said first and second ends of said first fluid conduit being disposed outwardly from said inward and outward spirals and within said first generally planar region; and

a plurality of second fluid conduit assemblies, each of said second fluid conduit assemblies comprising a first plate and a second plate, said first and second plates being arranged in parallel association to define a second generally planar region therebetween, a spacer disposed between said first and second plates, said spacer defining a plurality of generally parallel channels within said second generally planar region between said first and second plates, each of said first generally planar regions of said plurality of said first fluid conduit assemblies being arranged in generally parallel association with a preselected one of said second generally planar regions of said plurality of second fluid conduit assemblies, each of said first plates of said plurality of second fluid conduit assemblies being connected in thermal communication with a preselected one of said first fluid conduits of said plurality of first conduit assemblies.



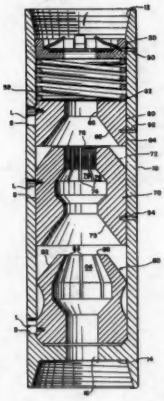


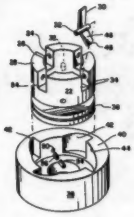
4,883,118

COMBINATION TUBING CUTTER AND RELEASING OVERSHOT

Clyde N. Preston, 110 Oakshire Dr., Houma, La. 70364

Filed Nov. 17, 1988, Ser. No. 272,401
Int. Cl.[4] E21B *31/16, 31/18*
U.S. Cl. 166—55.3 15 Claims





1. A tubing cutter comprising a hollow cylindrical housing containing:

a cutter assembly having plural knives with inclined upper cam surfaces,

a slip body above said cutter, said body comprising plural cam-operated slips for clamping said tubing by applying radial force thereto, and having a lower conical surface for engaging the upper cam surfaces of said knives,

a slip actuator above said slip body, said acutator having a lower conical surface for actuating said slips, and

means, above said slip actuator, for engaging a projection on said tubing,

said engaging means, said actuator and said slip body all being retained in installed axial positions within said housing by first, second and third shear pins, respectively, said pins having different strengths so as to fail progressively, the first pin being the weakest of the three and the third pin being the strongest,

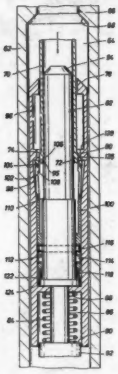
whereby when said device is placed over a length of tubing and then pulled upward toward said projection with progressive force, the tubing is first engaged by said engaging means, then clamped by actuation of the slips, and then cut by actuation of the cutter.

4,883,119

MECHANICAL LATCHING DEVICE OPERATED BY DEAD WEIGHT AND TENSION

Henry H. Leggett, Singapore, Singapore, assignor to Eastern Oil Tools PTE Ltd., Jurong, Singapore

Division of Ser. No. 145,376, Jan. 19, 1988, Pat. No. 4,828,023.
This application Aug. 1, 1988, Ser. No. 226,386
Int. Cl.[4] E21B *23/00*
U.S. Cl. 166—72 8 Claims



1. A mechanical latching device for repeatable latching and unlatching of downhole well tools, comprising:

(a) a tubular downhole tool mandrel for attachment in the tubing string of a well, said mandrel defining a downwardly directed internal stop shoulder;

(b) a fishing neck adapted for interconnection with said downhole well tool and being positioned in upstanding generally centralized relation within said mandrel and disposed for upward an downward movement within said mandrel;

(c) a collect member having a plurality of flexible collet fingers and being positioned about said fishing neck and movably disposed relative to said fishing neck, said collet fingers being radially yieldable and defining internal pulling shoulders;

(d) a compression spring being in force transmitting engagement with said collet member and said fishing neck and urging said collet member toward said latching position thereof relative to said fishing neck;

(e) a latch retainer element being received in movable relation about said fishing neck and being linearly movable from a latching position forming external support for said collet fingers to prevent radial expansion thereof to release position permitting radial expansion of said collet fingers, said latch retainer element further defining an upwardly directed latch release shoulder disposed for restraining engagement with said internal stop shoulder of said mandrel;

(f) means urging said latch retainer element to said latching position relative to said fishing neck and being yieldable upon engagement of said latch retainer element with said downwardly directed internal stop shoulder to permit the relative movement of said latch retainer element and said finishing neck to said release position upon predetermined upward movement of said fishing neck relative to said latch retainer element; and

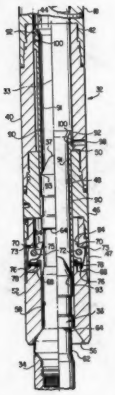
(g) latch actuator means having fixed relation with said fishing neck and forming a pulling flank for latching interengagement with said pulling shoulders of said latch fingers upon said predetermined upward movement of said latch actuator means by upward force applied to said latch actuator means by said collet member, said collet fingers being moved radially outwardly by said pulling flank of said latch actuator means thus releasing said latching interengagement between said pulling flank of said actuator means and said internal pulling shoulders of said collet fingers.

4,883,120

LATCHING TOOL FOR RETRIEVING WELLBORE DEVICES

Thomas Schasteen, Garland, and Lonnie J. Smith, Allen, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jan. 18, 1989, Ser. No. 298,391
Int. Cl.[4] E21B *31/18*
U.S. Cl. 166—98 6 Claims



1. A latching tool for latching onto a head member connected to a wellbore device and wherein said head member includes a means forming a transverse surface thereon, said latching tool comprising:

elongated body means including means for connecting said latching tool to a tubing string insertable in said wellbore for disposition of said latching tool at the lower end of said tubing string;

a guide surface on said body means for engaging said head member for movement of said head member into a bore formed by said body means;

at least one pivotally mounted latching dog disposed on said body means and movable between a retracted position out of engagement with said head member to a position for engagement with said head member for retrieval of said device from said wellbore; and

means for holding said at least one latching dog in a retracted position, said means for holding being engageable by said head member for movement with said head member to release said latching dog for engagement with said head member.

4,883,121

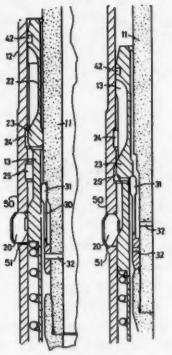
DOWNHOLE LOCK ASSEMBLY

Klaas Zwart, Peterculter, Scotland, assignor to Petroline Wireline Services Limited, Scotland

Filed Jul. 5, 1988, Ser. No. 215,331
Claims priority, application United Kingdom, Jul. 7, 1987, 8715967
Int. Cl.[4] E21B *23/02*
U.S. Cl. 166—217 8 Claims

1. A downhole lock assembly comprising a lock mandrel connected to a running tool which holds an inner mandrel

located within a body of the lock mandrel in a position which allows lock-out keys of the lock mandrel to remain within the outside diameter of the lock mandrel body, shear pins adapted on downward jarring against a landing nipple to expand the keys and shear pins adapted on upward jarring to release the running tool, said running tool having a tell-tale indicating device to indicate that the lock mandrel is correctly set in the landing nipple, the inner mandrel being resiliently urged in an upward direction in the direction of flow from the well, to actuate the lock-out keys to set the lock, and latch means being provided to hold the inner mandrel in a downward disposition



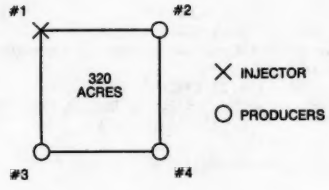
against its resilient means prior to setting the lock, and said tell-tale indicating device including collet means carried by the running tool and connected thereto by a shear pin, said collet means being adapted when the running tool is released from the lock mandrel after setting the lock to disengage intact from the lock mandrel if the lock-out keys are correctly set and to foul the inner mandrel and shear the shear pin if the lock-out keys are incorrectly set said collet means adapted to remain on said running tool and be withdrawn with said running tool when said running tool is released from said mandrel when said lock-out keys are correctly set and also when said lock-out keys are incorrectly set.

4,883,122

METHOD OF COALBED METHANE PRODUCTION

Rajen Puri, Tulsa, Okla., and Michael H. Stein, Houston, Tex., assignors to Amoco Corporation, Chicago, Ill.

Filed Sep. 27, 1988, Ser. No. 249,810
Int. Cl.[4] E21B *43/24, 43/30, 43/40*
U.S. Cl. 166—263 **21 Claims**



1. A method for producing coalbed methane from a coal seam containing coalbed methane and penetrated by at least one injection well and at least one producing well, said method comprising the steps of:

(a) injecting an inert gas through the injection well and into the coal seam; said inert gas being a gas that (i) does not react with the coal under conditions of use and (ii) that does not significantly adsorb to the coal; and

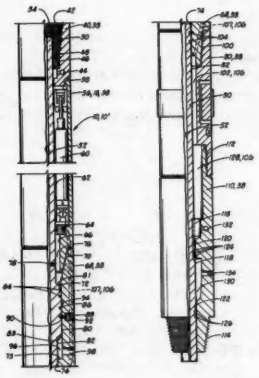
(b) producing a gas from the production well which consists essentially of the inert gas, coalbed methane, or mixtures thereof.

4,883,123

ABOVE PACKER PERFORATE, TEST AND SAMPLE TOOL AND METHOD OF USE

Gary D. Zunkel, Chickasha; H. Kent Beck, Duncan, both of Okla., and Jon B. Christensen, Ankeny, Iowa, assignors to Halliburton Company, Duncan, Okla.

Filed Nov. 23, 1988, Ser. No. 276,491
Int. Cl.[4] E21B *49/08*
U.S. Cl. 166—264 **19 Claims**



8. A downhole tool for testing fluid from a formation reservoir in a well, said tool comprising:

a packer connectable to a drill string and sealingly engageable with a well bore such that a first well annulus portion is defined above the packer and a second well annulus portion is defined therebelow;

a housing portion disposed above said packer and defining a sampling chamber therein, said sampling chamber having no communication with said tool string;

a valve disposed below said packer and having a valve portion therein in communication with said second well annulus portion;

passageway means for providing communication between said sample chamber and said valve; and

an operating mandrel slidably disposed in said housing portion, packer and valve for providing fluid communication between said sampling chamber and said port in said valve when in an open position.

4,883,124

METHOD OF ENHANCING HYDROCARBON PRODUCTION IN A HORIZONTAL WELLBORE IN A CARBONATE FORMATION

Alfred R. Jennings, Jr., Plano, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

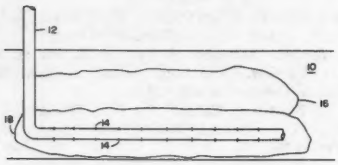
Filed Dec. 8, 1988, Ser. No. 281,170
Int. Cl.[4] E21B *43/27*
U.S. Cl. 166—307 **14 Claims**

1. An acid stimulation method for increasing the permeability of a carbonate formation where a horizontal wellbore is used to produce hydrocarbonaceous fluids therefrom comprising:

(a) filling said horizontal wellbore with a solution of a predetermined specific gravity containing one acid and an agent

to inhibit the precipitation of calcium sulfate which solution enters said formation via cracks or fissures communicating with said wellbore;

(b) injecting into said wellbore a displacement fluid of a specific gravity greater than said acid solution which fluid



displaces the acid substantially further into the formation; and thereafter

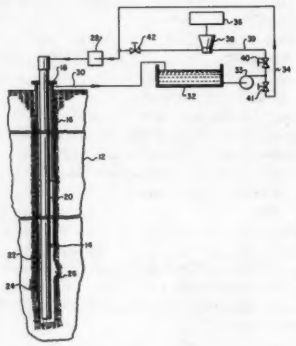
(c) allowing said acid to remain in contact with said formation for a time sufficient to solubilize compounds therein so as to cause the formation to become substantially more permeable.

4,883,125

CEMENTING OIL AND GAS WELLS USING CONVERTED DRILLING FLUID

William N. Wilson; Leon H. Miles; Brett H. Boyd, all of Plano, and Robert B. Carpenter, Hurst, all of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 11, 1987, Ser. No. 131,878
Int. Cl.[4] E21B *33/14, 33/16*
U.S. Cl. 166—291 **18 Claims**



1. A method for cementing a wellbore penetrating an earth formation into which a conduit extends, said wellbore having a space occupied by a drilling fluid to be converted to cement for cementing said space to form a seal between spaced apart points in said formation, said method comprising the steps of:

providing means for adding cement material and a dispersant to said fluid, circulating said fluid and adding said cement material and said dispersant to a quantity of said fluid in predetermined proportions to form a settable cement composition;

circulating said cement composition into said space to fill said space with said cement composition; and

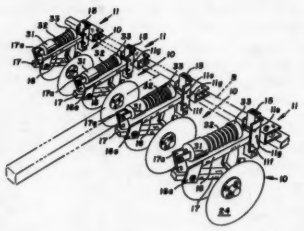
recirculating a quantity of said cement composition through said space.

4,883,126

RIDGE PLANTER GUIDE UNIT

Gregory Leland, P.O. Box 130, Bricelyn, Minn. 56014

Filed Feb. 21, 1989, Ser. No. 312,757
Int. Cl.[4] A01B *69/00*
U.S. Cl. 172—26 **8 Claims**



1. A guide unit arranged and adapted for mounting on a tool bar of a towed vehicle for guiding and maintaining seed planters and the like in operative position over preformed ridges, said guide unit including:

a. a first clamping member arranged and constructed to be received about and clamped to the tool bar;

b. a first stationary bar rigidly fixed to and extending forwardly of said first clamping member;

c. a second vertically moveable mounting bar hingedly attached to a forward end portion of said first stationary bar;

d. a pair of laterally spaced concave-convex disc members having facing convex surface rotatably mounted on said second bar positioned for contacting the sides of a preformed ridge for guiding therealong; and,

e. biasing means mounted on said first stationary bar and arranged and constructed for operative movement of said second, moveable mounting bar to normally urge said second bar and said discs into ground contacting relation whereby the position of the vehicle is controlled to maintain its position over the uppermost ridge surface.

4,883,127

SPRAYER MARKER

Claude Chevrier, 948 Warner Street, Moose Jaw, Saskatchewan, Canada S6H 5S4

Filed Feb. 21, 1989, Ser. No. 312,442
Claims priority, application Canada, Feb. 29, 1988, 560143
Int. Cl.[4] A01B *69/02*
U.S. Cl. 172—126 **17 Claims**

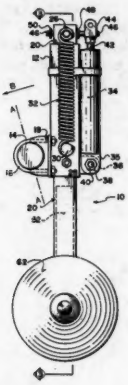
1. A field marker for attachment to a spray boom, comprising:

a stationary member including elongate guide means and means for clamping the guide means to the spray boom with the guide means in a generally upright orientation;

a moveable member mounted on the guide means for free up and down movement therealong;

a spring means connecting the stationary and moveable members and biasing the moveable member to a marking

position extending downwardly from the stationary member;



power means for selectively moving the moveable member against the biasing force of the spring means; and

a marker disk mounted on the moveable member.

4,883,128

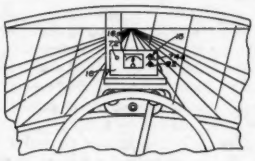
GUIDANCE SYSTEM FOR FARM IMPLEMENTS

Donald L. O'Neall, Rte. 1, Box 165, Downs, Ill. 61736, and Kerry L. Meyer, Bloomington, Ill., assignors to Donald L. O'Neall, Downs, Ill.

Continuation of Ser. No. 892,124, Jul. 30, 1986, abandoned. This application Nov. 14, 1988, Ser. No. 271,375

Int. Cl.[4] A01B *69/00*

U.S. Cl. 172—430 **6 Claims**



1. In combination with a tractor and a drawn implement mounted to said tractor and located behind said tractor; the improvement comprising a guidance system for providing an indication to the operator of the tractor of variance of the implement from a desired course relative to crop rows as the implement is drawn therealong, said guidance system comprising: position sensing means including crop-engaging rod means having first and second portions extending in spaced relation for engaging the crop when said implement deviates from a desired course; support means including rotatable means mounting said sensing rod means to said implement, said sensing rod means causing said rotatable means to rotate about a vertical axis whenever the implement deviates from the desired course and said sensing rod means engages a row of crop; error signal generating means coupled to said rotatable means for generating an error signal indicative of the amount and direction of rotation of said rotatable means; and indicating means including an analog meter and drive circuit means for said meter responsive to said error signal generating means, said meter being mounted on the tractor in the normal line of sight of the operator in the forward direction, said drive circuit means being responsive to said error signal for driving an indicating needle of said meter from a midscale position by an amount and in a direction corresponding to the error signal.

4,883,129

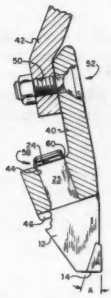
BIT ASSEMBLY UTILIZING CARBIDE INSERT

Alan H. Lonn, Edelstein, Ill., and Daniel W. Nelson, Rogers, Ak., assignors to Caterpillar Inc., Peoria, Ill.

Filed Dec. 16, 1988, Ser. No. 285,565

Int. Cl.[4] E02F *9/28, 3/815;* E21C *35/18*

U.S. Cl. 172—777 **13 Claims**



1. An earth working bit assembly, comprising:

a body having a substantially planar leading surface and

a hardened insert having top and bottom portions and first and second opposed surfaces, the thickness of said hardened insert, between said first and second opposed surfaces, increases from the top portion to the bottom portion and defines an angle in the range of 10 degrees ot 45 degrees, and the first opposed surface of said hardened insert is bonded to the leading surface of said body.

4,883,130

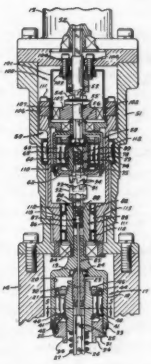
DUAL SPEED TRANSMISSION FOR AUTOMATIC ASSEMBLY MACHINE

Paul H. Dixon, Belvidere, Ill., assignor to Dixon Automatic Tool, Inc., Rockford, Ill.

Filed Aug. 31, 1988, Ser. No. 238,487

Int. Cl.[4] B23Q *5/04*

U.S. Cl. 173—12 **6 Claims**



1. An automatic assembly machine having a rotatable spindle and a rotary motor, and a drive transmission for causing said motor to rotate said spindle first at a fast speed and then at

a significantly slower speed, said transmission having a rotatable input and having first and second rotatable outputs, said motor being connected to said input and being operable to rotate said input, a torque-responsive clutch coupled between said input and said first output and operable to cause said input to rotate said first output at said fast speed as long as the torque imposed on said first output is below a predetermined magnitude, said clutch automatically releasing and interrupting the drive between said input and said first output when the torque imposed n said first output exceeds said predetermined magnitude, means coupling said input to said second output and causing said input to rotate said second output at a speed significantly slower than said fast speed, and a second clutch operable to cause said first output to rotate said spindle as long as the speed of said first output exceeds the speed of said second output, and said second clutch being operable to cause said second output to rotate said spindle when the drive between said input and said first output is interrupted by said torque-responsive clutch.

4,883,131

CORE ORIENTATION SYSTEM

William B. Foster, P.O. Box 115, Garson, Ontario, Canada P0M 1V0

Filed May 23, 1988, Ser. No. 197,495
Int. Cl.[4] E21B *25/16, 47/024*
U.S. Cl. 175—44 **9 Claims**

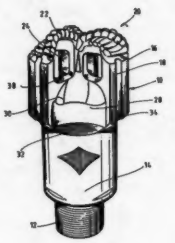
1. A core sampling and orientation apparatus comprising, in combination, a sampling tube having a front end and a rear end, said sampling tube having a cylindrical wall and a front end opening for receiving a core sample from a rock formation, said sampling tube including retention means for grasping said core sample, and said sampling tube having a plurality of aligned slots formed longitudinally along the cylindrical wall parallel to the tube longitudinal axis, said slots having a width sufficient to permit the scribing of a line along a core contained within the sampling tube, an instrumentation housing tube having a front end and a rear end, means for securing the rear end of the sampling tube to the front end of the instrumentation tube, angular orientation means formed on the instrumentation housing tube to permit angular alignment of the sampling tube and said plurality of slots with the instrumentation housing tube, and means contained within said instrumentation housing tube for indicating the uppermost position of the instrumentation housing tube at a predetermined time during sampling, relative to the angular orientation means, whereby the core sample can be subsequently orientated to its original formation position and a line scribed along the core sample through the plurality of aligned slots.

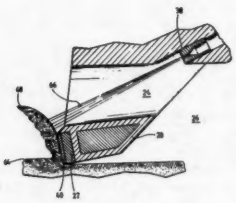
4,883,132

DRAG BIT FOR DRILLING IN PLASTIC FORMATION WITH MAXIMUM CHIP CLEARANCE AND HYDRAULIC FOR DIRECT CHIP IMPINGEMENT

Gordon A. Tibbitts, Salt Lake City, Utah, assignor to Eastman Christensen, Salt Lake City, Utah

Continuation of Ser. No. 106,793, Oct. 13, 1987, abandoned.
This application Sep. 9, 1988, Ser. No. 243,135
Int. Cl.[4] E21B *7/18, 10/60*
U.S. Cl. 175—65 **19 Claims**





1. A drill bit for drilling a borehole in an earth formation, comprising:

a bit body having connection means at the upper end thereof and a fluid passage extending therethrough from said connection means to the interior of said bit body;

at least one blade connected to said bit body therebelow and longitudinally spaced therefrom to define a cavity between said blade and said bit body;

a laterally extending cutting surface on said blade, said cutting surface having an upper extent proximate said cavity and a lower extent adapted to contact said earth formation and facing the direction of intended forward rotation of the bit; and

at least one nozzle associated with said cutting surface disposed in said bit body at a location behind said cutting surface relative to the direction of intended rotation of the bit and oriented generally in the direction of said rotation to direct a flow of hydraulic fluid from said fluid passage through at least a portion of said cavity proximate the upper extent of the cutting surface.

14. A method for preventing bit balling in the cutting of a plastic rock formation with a drill bit, comprising the steps of:

providing a bit having a bit body, a cutting surface and a cavity defined between the bit body and the cutting surface;

rotating said drill bit;

presenting substantially only said cutting surface to said plastic rock formation;

cutting said plastic rock formation with said cutting surface; and

removing rock cuttings cut by said cutting surface from said cutting surface by directing hydraulic flow through the cavity to a portion of said cutting surface most removed

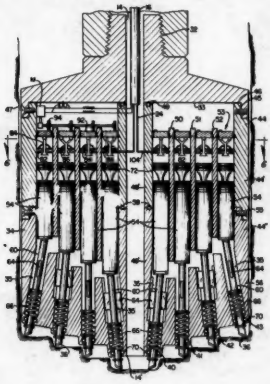
from said plastic formation from a nozzle positioned behind said cutting surface as defined by the direction of rotation of said drill bit.

4,883,133

COMBUSTION OPERATED DRILLING APPARATUS

Gerald L. Fletcher, and Gregory T. Fletcher, both of Box 6 KBYCL, Jakarta, Indonesia 12430

Filed Oct. 24, 1988, Ser. No. 261,596
Int. Cl.[4] E21B *4/06, 4/14, 4/16, 10/36*
U.S. Cl. 175—93 **20 Claims**



13. In a percussion drill bit apparatus for earth boring into subterranean formations wherein a drill bit housing is mounted at a lower end of a drill string, the improvement comprising:

a plurality of drill rods arranged for downward extension in a plurality of concentric rows through individual drill rod bores in the lower end of said housing including impact teeth at lower ends of said drill rods, said concentric rows of said drill rods vertically offset with respect to one another so that at least one inner row of said drill rods will extend to a greater depth into said formation than outer rows of said drill rods, and at least one outer row of said drill rods diverging downwardly and outwardly through said lower end of said housing, and means mounting said drill rods for slidable lengthwise reciprocal movement along respective longitudinal axes of said drill rods; and

drill rod drive means for sequentially imparting a percussive force to each said concentric row of said drill rods whereby to sequentially activate said drill rods and associated impact teeth successively from the innermost to outermost concentric rows to penetrate said formation.

4,883,134

MILLING MACHINE FOR CUTTING TRENCHES

Karl Bollinger, Rueil-Malmaison, and Daniel Barre, Moret-sur-Loing, both of France, assignors to Soletanche, Nanterre, France

Filed Sep. 25, 1987, Ser. No. 101,173
Claims priority, application France, Sep. 26, 1986, 86 13468
Int. Cl.[4] E21B *4/04, 10/00*
U.S. Cl. 175—96 **6 Claims**

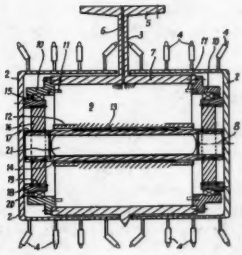
1. Milling apparatus for cutting trenches in the ground comprising:

(a) a central support arm in the form of a vertical plate;

(b) a hollow cylindrical bushing with a horizontal axis intersecting said plate;

(c) a bearing support plate supported on said bushing and fastened at each of its extremities;

(d) two semi-drums with cutting tools surrounding said bushing and being supported on each of said bearing support plates by means of bearings; and



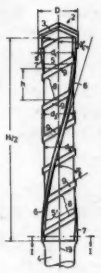
(d) a motor having a housing and a rotor located inside said bushing means maintaining said housing against rotation relative to said bushing, said rotor being rotatively connected to said semi-drums.

4,883,135

APPARATUS FOR ROCK DRILL

Bernhard Moser, Altshausen; Wolfang Peetz, Blitzenreute, and Hermann Hugger, Altshausen, all of Fed. Rep. of Germany, assignors to Hawera Probst GmbH & Co., Ravensberg, Fed. Rep. of Germany

Filed Aug. 24, 1988, Ser. No. 235,936
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1987, 8712650[U]; Oct. 19, 1987, 3735316; Dec. 1, 1987, 3740692
Int. Cl.[4] E21B *17/22*
U.S. Cl. 175—323 **19 Claims**



1. Rock drill for rotary and percussive drilling operation, comprising:

a drill head having a hard metal cutting edge;

a chucking shank; and

at least one transport coil having a substantially cylindrical core which has a longitudinal axis, a plurality of spiral-shaped longitudinal transport ribs extending a first predetermined distance from said cylindrical core, and a plurality of spiral-shaped secondary transport ribs extending from said cylindrical core a second predetermined distance which is smaller than said first predetermined distance, said secondary transport ribs connecting adjacent ones of said longitudinal transport ribs, adjacent ones of said plurality of longitudinal transport ribs respectively bounding main transport grooves, each of said main transport grooves being continuous and spiral-shaped along said cylindrical core, adjacent ones of said plurality of secondary transport ribs respectively bounding secondary

transport grooves, each of said plurality of longitudinal transport ribs having a relatively steep pitch along said cylindrical core and consequently a relatively small angle of twist relative to said longitudinal axis, and each of said secondary transport ribs having a relatively small pitch and consequently a relatively large angle of twist relative to said longitudinal axis.

4,883,136

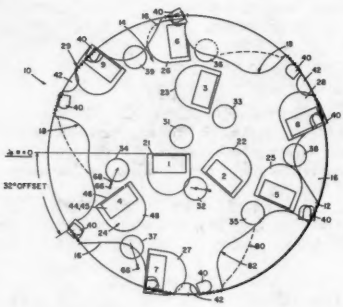
LARGE COMPACT CUTTER ROTARY DRILL BIT UTILIZING DIRECTED HYDRAULICS FOR EACH CUTTER

William R. Trujillo, West Jordan, Utah, assignor to Eastman Christensen Co., Salt Lake City, Utah

Division of Ser. No. 906,169, Sep. 11, 1986, abandoned. This application Jan. 19, 1988, Ser. No. 144,958

Int. Cl.[4] E21B *10/60*

U.S. Cl. 175—339 **12 Claims**



1. An improvement in a rotating bit having a bit face and gage including at least one junk slot defined in said gage of said bit, said junk slot extending substantially longitudinally along said gage and having a compound profile along said longitudinal extent, said compound profile including at least two distinct substantially longitudinally superimposed regions of differing cross-sectional configuration connected by a hydrodynamically smooth transition region.

4,883,137

SYSTEM AND METHOD FOR CONTROLLING THE GROUND SPEED AND ENHANCING THE MANEUVERABILITY OF AN OFF-ROAD VEHICLE

Lee J. Wanie; Robert N. Behrens, both of Horicon; Stanley J. DeBraal, West Bend, and Michael Bedis, Oconomowoc, all of Wis., assignors to Deere & Company, Moline, Ill.

Division of Ser. No. 901,716, Aug. 27, 1986, Pat. No. 4,759,417. This application Jul. 7, 1988, Ser. No. 216,689

Int. Cl.[4] B60K *23/00*; B62D *1/00*

U.S. Cl. 180—6.34 **11 Claims**

2. A cruise control mechanism for a vehicle having a variable speed transmission, a means for driving said vehicle including a forward and reverse pedal and a master brake and a turn brake system comprising:

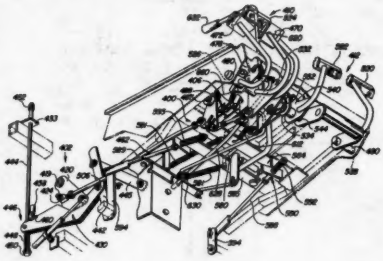
two connecting links coupled with the forward pedal for movement therewith;

a pivotable ratchet with teeth is pivotably connected between said connecting links;

a shaft carrying a pawl having a means for selectively engaging the various teeth of said ratchet when said vehicle is being driven in a forward direction upon movement of the forward pedal;

and

a strap fastened to said pawl shaft and coupled with a cruise control linkage rod for selectively moving the pawl shaft



and pawl, said strap also connected with an adjustable link which in turn is connected to said master brake.

4,883,138

FOUR-WHEEL DRIVE VEHICLE OPERATING SYSTEM

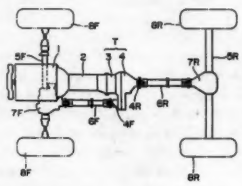
Osamu Kameda, Hiroshima, and Hirokazu Yamasaki, Higashihiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 27, 1988, Ser. No. 186,965

Claims priority, application Japan, Apr. 27, 1987, 62-103645

Int. Cl.[4] B60K *17/34*

U.S. Cl. 180—249 **12 Claims**



1. In an operating system used in a vehicle equipped with four-wheel drive having a center-differential which is shiftable between a differential-locked and a differential-free drive mode of operation and between a two-wheel and a four-wheel drive mode of operation, and a free-wheeling device with a clutch means incorporated in an output shaft of an axle differential in association with wheels which are non-driven when the vehicle is in said two-wheel drive mode of operation, said clutch means being adapted to disconnect the transmission of driving power between said axle differential and said non-driven wheels when the vehicle is in said two-wheel drive mode of operation and to connect a transmission of driving power between said axle differential and said wheels when the vehicle is in said four-wheel drive mode of operation, the improvement comprising:

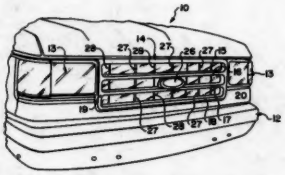
transfer case shift means operable between at least two positions for selecting said two-wheel drive mode and four-wheel, differential-free drive mode; and

shift control means responsive to an operation of said transfer case shift means for shifting said center-differential to from one to the other between said two-wheel drive mode and four-wheel, differential-free drive mode, said shift of drive mode of said center-differential being accompanied by an intermediate transition of said center-differential to a differential-locked drive mode.

4,883,139
WINTER FRONT FOR THE GRILL OF A MOTOR VEHICLE

Edward J. Gross, Ile Des Chenes, Canada, assignor to Sundawn Inc., Manitoba, Canada

Filed Nov. 14, 1988, Ser. No. 270,587
Int. Cl.[4] B60K *11/08*
U.S. Cl. 180—68.6 **18 Claims**



1. A motor vehicle having a front grill comprising a front face defined by a plurality of transverse ribs and a plurality of vertical ribs forming therebetween a plurality of apertures through the grill for cooling air to pass into an engine compartment of the vehicle, each of the ribs having a front face defining the front face of the grill, and a plurality of structural elements each associated with a respective one of the apertures and lying in a plane spaced rearwardly of the front face of the grill, and a winter front covering the grill to reduce the amount of cooling air flowing therethrough, the winter front comprising a plurality of separate panels each formed of a plastic sheet material, each panel defining a front surface having a shape to cover at least part of one of said apertures leaving the front face of the ribs exposed, each panel being sufficiently rigid so as to be self supporting across the aperture, each panel having thereon fastening means extending rearwardly therefrom and engaging said structural element of the grill so as to fasten the panel to the grill, the fastening means of each panel being separate from the fastening means of the other panels such that each panel can be separately attached to and removed from the grill.

4,883,140
SHEET MATERIAL DISPENSING FOR AIR BEARING STRUCTURES

James J. Harp, Annandale, Va., and Robert Molten, Hagerstown, Md., assignors to Admiralty Group Ltd., New London, Conn.

Continuation-in-part of Ser. No. 42,815, Apr. 27, 1987. This application Mar. 15, 1988, Ser. No. 168,407
Int. Cl.[4] B60V *1/00*; B65H *20/38*
U.S. Cl. 180—116 **20 Claims**

1. An assembly for moving a heavy load out of or into an overseas transport container over a deck, comprising:

(a) at least one finger having a plurality of air bearings disposed along the bottom of a length thereof and operatively connected to a source of air under pressure;

(b) a coiled supply of sheet material capable of providing a smooth surface for the air bearings of the finger to traverse;

(c) means for supplying substantially constant tension to said supply of sheet material to allow proper uncoiling and coiling thereof;

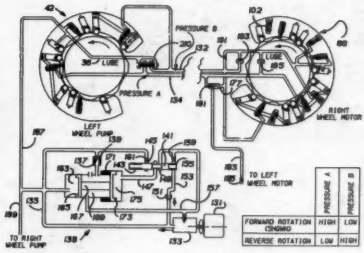
(d) means for engaging a free end of said sheet material to hold said free end relatively stationary with respect to said engaging means; and

(e) means for mounting said structures (b), (c) and (d) to allow said sheet material to be uncoiled as said air bearings move with respect to the deck, to dispense sheet material over the deck and thereby facilitate movement of the air bearings over the deck.

4,883,141
HYDRAULIC WHEEL MOTOR AND PUMP

Frank H. Walker, Grand Blanc, Mich.

Filed Apr. 22, 1988, Ser. No. 185,122
Int. Cl.[4] B60K *25/04*
U.S. Cl. 180—243 **6 Claims**



1. A hydraulic drive apparatus for a motor vehicle having a pair of left and right mechanically driven wheels, and a pair of left and right non-mechanical driven wheels, said hydraulic drive apparatus comprising:

a right and left rotary hydraulic pump coupled to the right and left mechanically driven wheel respectively, each of said pumps having an A and B port providing a fluid output and a fluid input respectively when the vehicle is driven in the forward direction, and a fluid input and a fluid output respectively when the vehicle is driven in reverse;

a right and left rotary hydraulic motor coupled to the right and left non-mechanically driven wheel respectively, each of said motor having an A and B port providing a fluid input and fluid output respectively when the vehicle is driven in the forward direction, and a fluid output and fluid input respectively when the vehicle is driven in reverse;

conduit means for hydraulically coupling the A and B ports of the right rotary hydraulic pump to the A and B ports of the left rotary hydraulic motor respectively, and hydraulically coupling the A and B ports of the left rotary hydraulic pump to the A and B ports of the right rotary hydraulic motor respectively, forming a pair of substantially independent closed-loop hydraulic circuits; thereby maximizing the vehicle's tractive force when one side of the vehicle is placed on a low friction coefficient surface; and

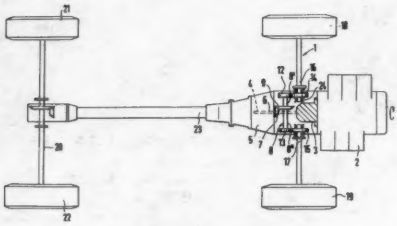
means for by-passing sufficient hydraulic fluid between the two closed-loop hydraulic circuits to enable the vehicle to make tight turns without wheel slippage.

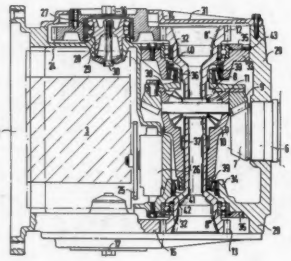
4,883,142

DRIVE ARRANGEMENT FOR CONNECTING A VEHICLE OUTPUT SHAFT TO A VEHICLE AXLE

Siegfried Rispeter, Besigheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Weissach, Fed. Rep. of Germany

Filed Sep. 9, 1988, Ser. No. 242,312
Claims priority, application Fed. Rep. of Germany, Sep. 9, 1987, 3730251
Int. Cl.[4] B60K *17/22*
U.S. Cl. 180—245 **8 Claims**





1. A drive arrangement for connecting a vehicle output shaft to a vehicle axle comprising an engine having an engine housing, an axle housing connected to said engine housing a clutch having a housing flangedly connected to the engine housing, a change-speed transmission having an output shaft and axle drive means including axle drive shafts and a U-shaped drive connection means forming a U-shaped intermediate space in said axle housing and connecting the transmission output shaft to the axle drive shafts driving vehicle wheels, the U-shaped connection means having an intermediate shaft substantially parallel to the axle drive shafts, a bevel gear-angle drive means connecting the transmission output shaft to the intermediate shaft and spur gear pairs for driving the axle drive shafts arranged on each end of the intermediate shaft substantially at right angles thereto, the clutch housing extending into the U-shaped intermediate space.

4,883,143

ANECHOIC COATING FOR ACOUSTIC WAVES

Michel Lagier, Le Cannet, France, assignor to Thomson-CSF, Paris, France

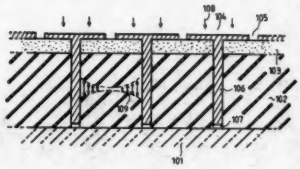
Filed Oct. 26, 1988, Ser. No. 262,998
Claims priority, application France, Oct. 27, 1987, 87 14826
Int. Cl.[4] E04B *1/82*
U.S. Cl. 181—286 **5 Claims**

1. An anechoic coating for acoustic waves, adapted to be placed on a reflecting wall, comprising:

a first layer of elastic material of low compressibility, which is highly absorbent under shearing waves, and which is fixed at one surface thereof to said wall;

a second layer of highly compressible elastic material fixed to an opposite surface of the first layer;

a set of rigid plates fixed to the second layer opposite said first layer to receive the acoustic waves; and



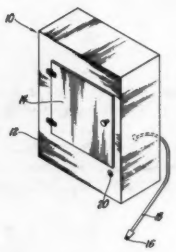
a set of rigid rods fixed to a bottom portion of the plates, which extend through the second layer and anchored in the first layer to exert shear stresses on the first layer in response to acoustic waves received by the plates.

4,883,144

NOISE ABSORBING HOUSING FOR A BLENDER

Frederick W. Haushalter, 365 N. Detroit St., Kenton, Ohio 43326, and John S. Robinson, 3200 S. Ala, Unit #130, St. Augustine, Fla. 32084

Filed Aug. 26, 1988, Ser. No. 240,712
Int. Cl.[4] H02K *5/24*
U.S. Cl. 181—198 **1 Claim**



1. A noise absorbing housing for absorbing noise generated by blenders, the housing comprising:

a structure composed of noise absorbing materials for enclosing the blender;

a dead air within the structure and surrounding the enclosed blender, the space comprising an area for noise absorption;

a door on the housing for allowing access to the blender wherein the blender is enclosed within the structure and surrounded by the area of dead air space;

internal circuitry connectable to a power source for supplying power to the enclosed blender, wherein power is applied to operate the blender when the door is closed;

an indicator light for indicating when the enclosed blender is in operation; and

a temperature sensitive device for shutting off power to the enclosed blender if the blender is over-heating.

4,883,145

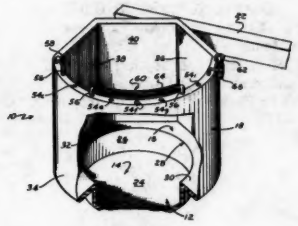
ERGONOMIC AERIAL BASKET

Charles D. Deltatto, 184 Northampton St., Easthampton, Mass. 01027

Continuation-in-part of Ser. No. 155,537, Feb. 12, 1988, abandoned. This application Jan. 25, 1989, Ser. No. 280,831

Int. Cl.[4] B66F *11/04*

U.S. Cl. 182—2 11 Claims



1. An aerial basket for elevating a worker within a partially enclosed platform, comprising:

a. a floor of the basket;

b. a plurality of interconnected walls affixed to the floor that rise perpendicularly up from the floor;

c. a circular well in the floor in which the worker may stand;

d. a cylindrical wall connected to an outer edge of the well that rises perpendicularly up from the well; and

e. a footrest platform that is O-shaped and connected at its inner edge to an upper edge of the cylindrical wall and at its outer edge to the bottom edges of the interconnected walls, wherein the footrest platform is elevated above and surrounds the circular well so that the platform is adapted to receive a raised, extended foot of the worker.

4,883,146

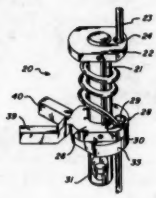
DESCENT CONTROL DEVICE WITH DEADMAN BRAKE

Horace M. Varner, and Ernest L. Stech, both of Littleton, Colo., assignors to Frost Engineering Development Corporation, Englewood, Colo.

Filed Dec. 30, 1988, Ser. No. 292,294

Int. Cl.[4] A62B *1/14;* B65H *59/14*

U.S. Cl. 182—5 5 Claims



1. A descent control device for lowering a load along a rope from an elevated position at which said rope is anchored to a relatively lower position, said device including a friction cylinder of a length adapted to receive a plurality of turns of rope wrapped therearound, said cylinder having an upper end and a lower end, top and bottom end plates attached respectively adjacent the upper and lower ends of said cylinder, said end plates both having a portion thereof overhanging the cylinder and defining apertures sized to loosely receive the rope, the aperture defined in the bottom plate including an arcuate slot with an entryway of a width adapted to freely admit the rope and tapering from said entryway as it follows the contour of the cylinder partially therearound to a relatively narrower blind end, and means depending from the lower end of said cylinder for attaching a load carrying device, wherein the improvement comprises, a locking end plate rotatably mounted on said cylinder below said lower end plate in close juxtaposition therewith, means defining an aperture in said locking plate for loosely receiving the rope, means biasing said locking plate to rotate said plate to forceably urge said rope into the narrowly tapered slot in said lower end plate for locking said cylinder against movement on said rope, and handles on said lower end plate and said locking plate for moving said locking plate with respect to said lower end plate to position said rope in the aperture in said lower end plate to release said cylinder for controlled movement along said rope.

4,883,147

SCAFFOLDING SYSTEMS AND CLAMPING DEVICES THEREFOR

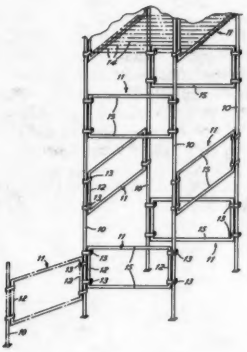
Derek G. Davison, and Gordon T. Pover, both of Kent, England, assignors to Derek George Davison, Kent, England

Filed Jun. 27, 1988, Ser. No. 211,921

Claims priority, application United Kingdom, Jun. 25, 1987, 8714945

Int. Cl.[4] E04G *1/14, 7/06*

U.S. Cl. 182—179 4 Claims



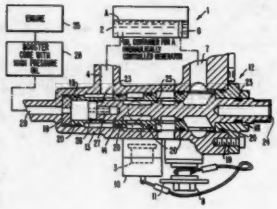
1. A scaffolding system comprising vertical members, a plurality of rectangular frame units each having vertical side elements and horizontal top and bottom elements joining the side elements, each of which side elements is disposed adjacent and parallel to respective vertical members, and individual clamping devices securing the side elements of the frame units to said respective vertical members, each clamping device comprising an angle element one arm of which is generally twice as long as the other, a second element which is hinged by one of its ends to the free end of said one arm and which is substantially equal in length to said other arm, a third element which is substantially equal in length to said one arm and which has one end thereof hingedly connected to the other end of said second element, interlocking means between the other end of said third element, and the free end of said other arm which interlocking means is engageable by movement of the third element lengthwise of itself, a dividing element connected to said one arm at substantially its mid-length and extending generally parallel to said other arm and clamping means, a vertical side element and a vertical members being disposed on opposite sides of the dividing element and enclosed in the device by engagement of the interlocking means.

4,883,148

FILL VALVE FOR LIQUID CONTAINING DEVICE

Richard C. Welch, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Oct. 11, 1988, Ser. No. 255,834
Int. Cl.[4] F01M *1/18*
U.S. Cl. 184—6.4 14 Claims



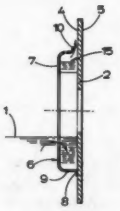
1. A device for use in conjunction with an engine, comprising means for containing liquid, fill passage means for adding liquid to the means for containing a liquid, drain passage means for draining liquid from the means for containing a liquid, movable valve means for opening and closing said fill passage means and said drain passage means, and means for positioning said valve means so as to close both said fill passage means and said drain passage means in response to start-up of said engine.

4,883,149

VEHICLE DISC BRAKES OF THE LIQUID COOLED TYPE

Roy Campbell, Worcestershire, England; Anthony G. Price, and Andrew P. Green, both of Gwent, Wales, assignors to Lucas Industries public limited company, Birmingham, England

Filed Jul. 28, 1988, Ser. No. 225,185
Claims priority, application United Kingdom, Jul. 28, 1987, 8717877
Int. Cl.[4] F16D *65/78, 55/02, 13/72, 13/74*
U.S. Cl. 188—264 E 21 Claims



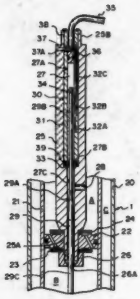
1. A vehicle disc brake of the liquid-cooled type comprising a housing, at least one rotatable friction braking member having a friction surface and being disposed within said housing and slidably keyed to a shaft to be braked, said housing containing cooling liquid for cooling said braking member, means defining a relatively stationary braking surface in said housing, and actuating means for urging said friction surface of said braking member into engagement with said relatively stationary braking surface to apply said brake, wherein said braking member comprises a generally planar plate member having a first radial surface on one side and a second, axially spaced, radial surface on the other side, and a reservoir member secured to said plate member at said first radial surface and disposed to said one side of said plate member, said reservoir member having a region which is axially spaced from said first surface of said plate member and part-defines an annular reservoir for cooling liquid disposed to said one side of said plate member, and wherein passage means are arranged to control the release of liquid from said annular reservoir to the friction surface in response to centrifugal force.

4,883,150

HYDRAULIC SHOCK ABSORBER WITH PISTON ROD POSITION DETECTING MEANS

Susumu Arai, Kanagawa, Japan, assignor to Tokico Ltd., Kanagawa, Japan

Filed Mar. 1, 1988, Ser. No. 162,713
Claims priority, application Japan, Mar. 20, 1987, 62-67050
Int. Cl.[4] F16F *9/48;* F16D *66/00;* G01B *7/14*
U.S. Cl. 188—289 6 Claims



1. A hydraulic shock absorber comprising:

a shock absorber body;

a piston disposed within said shock absorber body and slidable therein,

two fluid-receiving chambers being defined in said shock absorber body on opposite sides of said piston, respectively;

a piston rod having one end thereof connected to said piston and the other end thereof projecting from said shock absorber body,

said piston rod including an orifice, a hollow portion the interior of which is open to said orifice, and a radial bore open to the interior of said hollow portion and one of said fluid-receiving chambers,

said fluid-receiving chambers being in fluid communication via said radial bore, the interior of said hollow portion and said orifice;

a rod-shaped member having one end thereof secured to said shock absorber body at an inner portion thereof and extending in an axial direction through said orifice,

said rod-shaped member having a cross-sectional area that varies as taken along said axial direction so as to regulate the flow of fluid from said one of said fluid-receiving chambers to the other of said fluid-receiving chambers to a degree corresponding to the relative position of said orifice and said rod-shaped member; and

detector means for detecting the relative position of said piston rod and said rod-shaped member,

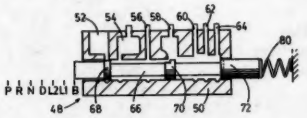
said detector means including a detector body having a tubular shape a magnet integral with said rod-shaped member, and a plurality of magnetically actuatable switches embedded in said detector body and spaced apart at predetermined intervals in the axial direction of the detector body,

said detector body disposed in said piston rod in the hollow portion thereof, and said rod-shaped member extending within said detector body.

4,883,151
TRANSMISSION BRAKE

Stephen R. Tobler, Post Office Box 779, Station 'J' , Calgary, Alberta, Canada (T2A 6A6)

Filed May 23, 1988, Ser. No. 197,440
Int. Cl.[4] B60K *41/26;* F16H *47/00*
U.S. Cl. 192—4 A 7 Claims

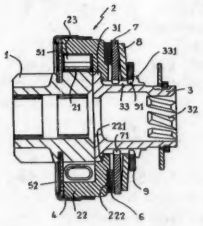


1. An automotive transmission including:
a torque converter;
a gear set driven by the torque converter;
a gear set conditioning means for establishing plural power transmission paths with different transmission ratios through the gear set;
a selector manually positionable in a plurality of selected positions, including a transmission brake position and a plurality of gear positions, the transmission brake position being adjacent a first gear position;
operating means responsive to the positioning of the selector in the first gear position to operate the gear set conditioning means to establish a first gear power transmission path through the gear set, and responsive to the positioning of the selector means in the transmission brake position to operate the gear set conditioning means to establish the first gear power transmission path and a second power transmission path with a different transmission ratio through the gear set, whereby the gear set is locked; and
means biasing the selector from the transmission brake position to the first gear position whereby on manual release of the selector, the second transmission path is released.

4,883,152
STARTER DRIVE ASSEMBLIES FOR INTERNAL COMBUSTION ENGINES OF THE TYPE HAVING AN OVERRUNNING CLUTCH

Francis Froment, Lyons, France, assignor to Societe Equipements Electriques Moteur, Creteil, France

Filed May 13, 1988, Ser. No. 193,682
Claims priority, application France, May 21, 1987, 8707355
Int. Cl.[4] F16D *7/06, 15/00*
U.S. Cl. 192—42 8 Claims

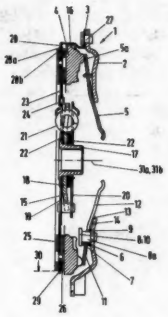


1. A starter drive assembly of an internal combustion engine, said assembly comprising:
an overrunning clutch, a drive pinion defining an inner track of the overrunning clutch, a cam housing axially retained in the clutch relative to said drive pinion and defining an outer track of the overrunning clutch extending around said inner track and a flange-receiving recess, roller means on the overrunning clutch disposed in the assembly between said inner and said outer tracks, a drive sleeve having a flange seated in the flange-receiving recess defined by said housing and an angular fastening portion located on the outer peripheral surface of the sleeve, and torque limiting means operatively connected between said cam housing and said drive sleeve for allowing torque to be transmitted from said drive pinion to said drive sleeve through the overrunning clutch when torque applied to said drive pinion is below a predetermined value and for preventing torque from being transmitted from said drive pinion to said drive sleeve through the overrunning clutch when torque applied to said drive pinion exceeds said predetermined value,
said torque limiting means including a friction lining disposed against said cam housing, a driving plate disposed against said friction lining and an elastic mechanism exerting a force on said driving plate that urges said driving plate against said friction lining,
said driving plate engaging said driving sleeve at the angular fastening portion thereof, the angular fastening portion preventing said driving plate from rotating relative to said drive sleeve.

4,883,153
FRICTION CLUTCH

Edmund Maucher, Wooster, Ohio; Lothar Huber, Bühl, Fed. Rep. of Germany; Kurt Frietsch, Bühlertal, Fed. Rep. of Germany, and Paul Maucher, Sasbach, Fed. Rep. of Germany, assignors to Luk Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany

Filed Dec. 17, 1987, Ser. No. 134,326
Claims priority, application Fed. Rep. of Germany, Dec. 17, 1986, 3643109
Int. Cl.[4] F16D *13/44, 13/58*
U.S. Cl. 192—70.27 33 Claims



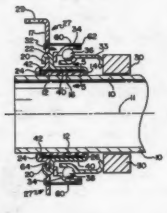
1. A friction clutch, particularly for attachment to a flywheel in a motor vehicle, comprising a rotary first unit including a cover, a pressure plate having a first side facing toward said cover and a second side adjacent the flywheel when the clutch is attached to the flywheel, resilient means reacting against said cover and arranged to bias said pressure plate, and means for non-rotatably but axially movably securing said pressure plate to said cover; a rotary second unit including a clutch plate adjacent the second side of said pressure plate; and means for separably coupling said units to each other, at least prior to attachment of the clutch to the flywheel, so that the axes of rotation of said units coincide or are closely adjacent one another and said units are permanently separable from each other during and subsequent to attachment to the flywheel, said coupling means including means for maintaining said clutch plate and said first unit in a predetermined axial position relative to each other.

4,883,154

SELF-ALIGNING BEARING CARRIER

Douglas A. Drewes, West Bloomfield, and Phillip D. Yee, Troy, both of Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed Jun. 2, 1988, Ser. No. 201,520
Int. Cl.[4] F16D *23/14*
U.S. Cl. 192—98 **8 Claims**



1. A clutch release apparatus for use with a stationary rectilinear guide element, said apparatus comprising:

a driven member surrounding said guide element for rectilinear motion thereon, said driven member comprising an outer sleeve and an inner sleeve located within said outer sleeve and slidably mounted on said guide element wherein said outer sleeve comprises radially inwardly extending walls captively retaining said inner sleeve against axial dislocation within an annular space circumscribed by said outer sleeve; and

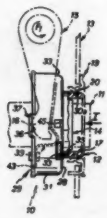
resilient spacer means located between said inner and outer sleeves and operable to absorb radial and angular misalignments between said sleeves.

4,883,155

CLUTCH RELEASE BEARING, IN PARTICULAR FOR AUTOMOTIVE VEHICLE

Christian Gay, Paris, and Philippe Lassiaz, Boulogne, both of France, assignors to Valeo, Paris, France

Filed Apr. 22, 1988, Ser. No. 186,713
Claims priority, application France, Mar. 27, 1985, 8504549
Int. Cl.[4] F16D *23/14*
U.S. Cl. 192—98 **16 Claims**



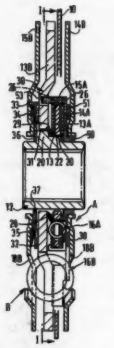
1. Clutch release bearing, comprising a drive member cooperable with a clutch release device of a clutch and an operating means having two axially shallow recesses, the bottom of each of the recesses faces axially towards said drive member and forms a transverse bearing facet cooperable with a clutch release yoke, the clutch release bearing being angularly displaceable relative to the clutch release yoke to bring said recesses into and out of registration with the clutch release yoke for selectively mounting and dismounting the clutch release bearing, wherein each of said recesses forms means for interlocking with said clutch release yoke to prevent, in operation, rotation of said operating means about the axis of the clutch release bearing, said operating means comprising an operating member and a cover for coupling said drive member axially to said operating member, wherein said transverse bearing facets are in one piece with said cover.

4,883,156

TORSION DAMPING DEVICE FOR A DISC TYPE FRICTION CLUTCH FOR AN AUTOMOBILE VEHICLE

Dieter Rohrle, Montmorency; Michel Graton, Paris, and Philippe Lhermitte, Senlis, all of France, assignors to Valeo, Paris, France

Filed Apr. 7, 1988, Ser. No. 178,983
Claims priority, application France, Apr. 7, 1987, 87 04882
Int. Cl.[4] F16D *3/66*
U.S. Cl. 192—106.2 **11 Claims**



1. A torsion damper for a disc type friction clutch for an automotive vehicle, of the kind comprising a lining support plate and a hub which are movable angularly with respect to each other within the limits of a predetermined angular displacement, the support plate and the hub being coupled together by two torsion damping devices arranged to act successively, one of which, namely a first device or pre-damper, is weaker than the other, namely a second device or main damper; comprising a damper plate mounted on the hub with a clearance permitting said angular displacement, two guide rings, fixed with respect to each other and disposed axially on either side of the damper plate, and a plurality of resilient angular displacement means interposed circumferentially between the damper plate and the rings; and further comprising associated friction means, in which said damper there is provided a centring means comprising a bush surrounding the hub, and a face plate fixed with respect to the bush and extending radially intermediate one of the guide rings and the damper plate of the main damper, axial elements being provided for centring the damper plate and projecting axially between the damper plate and the face plate, wherein the outer peripheral surface of the bush is in frictional contact with the inner peripheral edge of said one of the guide rings of the main damper, the face plate also having axially extending spacers the end surfaces of which make contact with the adjacent face of the damper plate of the main damper.

4,883,157

DOOR/LEDGE ASSEMBLY FOR GRAVITY CHUTE

Daniel R. McDermott, Clinton, Md., assignor to Trihard, S.A., Luxembourg, Luxembourg

Filed Dec. 7, 1988, Ser. No. 280,914
Int. Cl.[4] E04F *17/12*
U.S. Cl. 193—34 **6 Claims**

1. A gravity conveyor chute section of a type which can be engaged with other conveyor chute sections to form a gravity

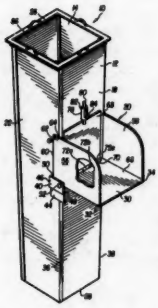
conveyor chute, the section comprising a sidewall having basically a tubular shape which guides items falling through a bore thereof, said section having an upstream end opening for receiving items dropped into said section from above and a downstream end opening for discharging said items passing through the bore of said section, at least one of said ends being selectively engagable with an adjacent section to form said conveyor chute to be longer than a single section whereby items serially fall through the bores of said thusly engaged sections, said section further defining a side opening through a panel of the sidewall thereof at a position intermediate said upstream and downstream ends through which items can be dropped into the bore of said section, said section including a door/ledge assembly mounted on said sidewall at said side opening, said door/ledge--assembly comprising:

a ledge and a ledge-hinge means for hingedly attaching said ledge to said sidewall below said side opening for allowing said ledge to be selectively rotated to a laterally-extending position extending laterally away from said sidewall, thereby forming a ledge below said side opening, and to a covering position for covering said side opening, said ledge being wider than the width of said panel of said sidewall with first and second side edges of said ledge extending beyond first and second side edges of said panel;

first and second side supports respectively attached to said first and second side edges of said ledge for extending to, and engaging said sidewall for providing support to said ledge when it is in the laterally-extending position, said first and second side supports being respectively positioned beyond said first and second side edges of said panel so that when said ledge is moved to the covering position said first and second side supports move along the outer surface of said sidewall beyond the respective first and second side edges of said panel; and

a door and a door-hinge means for hingedly attaching said door to said chute section below said opening for allowing said door to be selectively rotated to said laterally-extending position with said ledge and to said closed position with or without said ledge;

whereby said ledge can be moved to said closed position without blocking said bore and can be moved to a laterally-extending position while allow said door to be selective opened and closed.

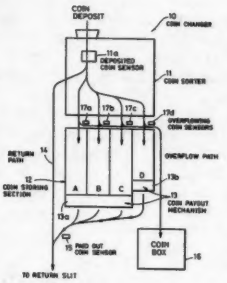


4,883,158

DEVICE AND METHOD FOR MANAGING AMOUNT OF STORED COINS

Osamu Kobayashi, Iruma; Yonezou Furuya, Hiki; Takeshi Isida, Sakado, and Mitsugu Mikami, Kawagoe, all of Japan, assignors to Kabushiki Kaisha Nippon Coinco, Tokyo, Japan

Filed Mar. 22, 1988, Ser. No. 171,688
Claims priority, application Japan, Mar. 24, 1987, 62-67985
Int. Cl.[4] G07D *3/16*
U.S. Cl. 194—217 **20 Claims**



19. A coin mechanism comprising:

coin discrimination means for discriminating a true coin from a false one among deposited coins;

a coin storing device for storing a deposited coin which has been detected as a true coin by said coin discrimination means and paying out a coin or coins among the stored coins for change or other purpose;

payout means for paying out a coin from said coin storing device;

a coin box receiving coins which have overflown from said coin storing device;

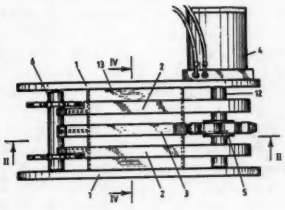
a plurality of coin sensors, one of said coin sensors provided for each denomination in a passage leading coins which have overflown from said coin storing device to said coin box and detecting a coin passing through said passage.

4,883,159

FEEDER APPARATUS FOR TIMBER HARVESTERS

Lauri K. Ketonen, Huvilekatu 15, SF 64120 Kristiinankaupunki, Finland

Continuation-in-part of Ser. No. 822,887, Jan. 27, 1986, Pat. No. 4,753,338. This application Apr. 5, 1988, Ser. No. 178,021
Claims priority, application Finland, May 29, 1984, 842152
The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.
Int. Cl.[4] B65G *15/10*
U.S. Cl. 198—626 **20 Claims**



1. A feeder apparatus for timber harvesters for pulling logs into the timber harvester comprising

a frame;

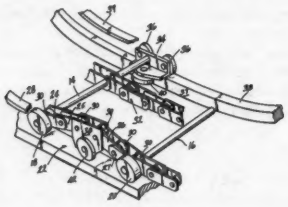
two outer side walls attached to the frame;
a first shaft supported by the side walls;
a second shaft supported by the side walls;
a drive means attached to the first shaft;
a cog wheel coaxially positioned on the first shaft;
a turning wheel positioned on the second shaft;
a three strand roller chain having middle strand of roller links and two outer strands of roller links with outer plates, where the roller chain rotates around the turning wheel and the cog wheel and where the cog wheel drives the center strand of roller links and where a respective turning wheel engages a respective outer strand;
log grabbing members attached to the outer plates of the two outer strands of roller links;
an inner rolling bed for supporting the middle strand of roller links;
outer rolling beds for supporting the two outer strands of roller links for essentially their total grab length, wherein the outer rolling beds are fitted to support the rollers of the outer strands of roller links in the area of the cog wheel over an angle of at least about 60 degrees of the roller chain's turn.

4,883,160

CURVED ESCALATOR WITH FIXED CENTER CONSTANT RADIUS PATH OF TRAVEL

Frank M. Sansevero, West Hartford, Conn.; Klaus Seehausen, Niedernwohren, Fed. Rep. of Germany; James A. Rivera, Bristol; Dat Nguyen, New Britian, both of Conn., and Peter Borchers, Bad Munder, Fed. Rep. of Germany, assignors to Otis Elevator Company, Farmington, Conn.

Filed Mar. 27, 1989, Ser. No. 328,935
Int. Cl.[4] B66B *21/02*
U.S. Cl. 198—328 **4 Claims**



1. An escalator assembly having an arcuate path of travel defined by a constant radius derived from a fixed center as viewed in plan, the escalator including horizontal entry and exit landing zones, an intermediate constant slope zone, and entry and exit transition zones of continuously varying slope interconnecting the constant slope zone with the entry and exit landing zones respectively, said escalator having turn around sprockets at each of said landing zones for reversing the direction of travel of the moving escalator components and said escalator assembly including:

(a) radially inner and outer tracks extending between said landing zones and through said transition and constant slope zones for supporting movement of steps along the path of travel of the escalator;

(b) a plurality of steps, each having: an upper tread portion which remains substantially horizontal throughout a people transporting portion of the path of travel of the escalator; a step axle at radially inner and outer sides of each step; radially inner and outer step axle rollers rotatably mounted on said step axles, said step axle rollers being operable to travel over said inner and outer tracks;

(c) a radially outer step chain forming a continuous connection between outer ends of said step axles whereby all of said steps are connected together by the outer step chain at their outer sides throughout the entire path of travel of the escalator;

(d) means for continuously changing the effective length of said outer step chain, without changing the actual length of said outer step chain as the steps move through each of said transition zones so as to move the outer ends of the step axles of adjacent steps toward and away from each other in said transition zones, whereby the steps are continuously guided along said arcuate path of travel said means for continuously changing comprising a camming bracket assembly mounted on said outer step chain between each pair of adjacent step axle rollers, said camming bracket assemblies each including a pair of brackets straddling said outer step chain and depending downwardly from adjacent links of said outer step chain, and a camming roller mounted on a lower end of each of said brackets, said camming rollers being spaced transversely of said step axle rollers, whereby said camming and said step axle rollers travel over transversely separated paths in said outer track; and said track being birfurcated in said landing and transitional zones whereby said separated paths are coplanar in said constant slope of said outer track, and vertically spaced apart in said transitional and landing zones of said outer track;

(e) a radially inner step chain forming a continuous connection between inner ends of said step axles whereby all of said steps are connected together by said inner step chain at their inner sides throughout the entire path of travel of the escalator, said inner step chain having a fixed and constant effective length throughout the entire path of travel of the escalator;

(f) a bracket connecting said inner step rollers to said step axles, said bracket also carrying a side thrust roller for engaging an outer side surface of said inner track to counter inwardly directed side thrust of the assembly during operation of the escalator;

(g) radially inner and outer upthrust tracks disposed above said inner and outer step axle rollers for engagement by the latter to resist upthrust of the assembly during operation of the escalator; and

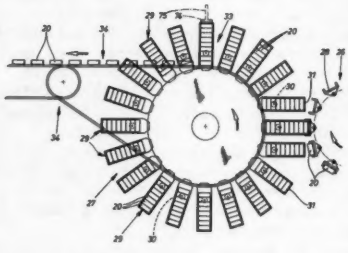
(h) said outer step chain having an effective length which equals its actual length when engaging said turnaround sprockets.

4,883,161

APPARATUS FOR THE FORM-STABILIZING STORAGE OF PACKS

Heinz Focke, Verden, Fed. Rep. of Germany, assignor to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed Apr. 14, 1987, Ser. No. 38,261
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1986, 3613482
Int. Cl.[4] B65G *47/52*
U.S. Cl. 198—347 **13 Claims**



1. Apparatus for the temporary form-stabilizing storage of cuboid soft cigarette packs with folding tabs connected by adhesive bonding, which can be introduced into pockets of a

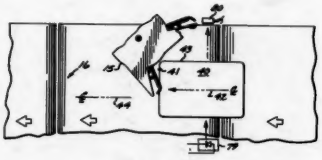
rotating turret and which can be pushed out of these after a dwell time, characterized in that each pocket is designed as a storage pocket (29) for receiving a plurality of packs (20), and after one revolution of the turret (27) the pack (20) located in the storage pocket (29) for the longest time is ejected and a new pack is introduced into the storage pocket (29); in that the storage pockets (29) are directed radially, and new packs (20) can be pushed into the respective storage pocket (29) via a radially outer pushing-in orifice (31) and the radially inner pack (20) can be pushed out of the storage pocket (29); and in that the radially inner pack (20) can be pushed out of the storage pocket (29) in the transverse direction, in a direction parallel to the axis of the turret (27), onto a pack discharge conveyor (34) running in a plane offset relative to the turret (27).

4,883,162

BAG TURNING APPARATUS

James M. Flot, Irvine, Calif., assignor to MHE Company, Inc., Santa Ana, Calif.

Filed Sep. 30, 1988, Ser. No. 252,057
Int. Cl.[4] B65G *47/24*
U.S. Cl. 198—374 **20 Claims**



1. A bag turning apparatus for rotating a bag having a front and side surface and moving along a path on a conveyor, comprising:

a bag turning wheel having an axis of rotation substantially normal to the plane of said conveyor and offset to the side of the path of the bags, said wheel including

first and second radial members, extending from said axis in a horizontal plane to form a substantially right angle,

means for (a) lowering said bag turning wheel to permit said first radial member to engage a bag moving on said conveyor and (b) turning said bag turning wheel to permit said second member to drive said bag side surface through a predetermined arc and to position said bag to have a predetermined orientation and to be moving on a predetermined track on said conveyor surface as the bag loses contact with said radial member; and

means for raising said bag turning wheel to permit free passage of said bags on said conveyor.

4,883,163

APPARATUS AND METHOD FOR REGULARLY SPACING APART RANDOMLY SPACED OBJECTS WHILE CONVEYING THEM

Antonio Gamberini, Bologna, and Fiorenzo Draghetti, Medicina, both of Italy, assignors to G.D. Società per Azioni, Bologna, Italy

Filed Dec. 4, 1987, Ser. No. 128,883
Claims priority, application Italy, Dec. 17, 1986, 3612 A/86
Int. Cl.[4] B65G *43/00*
U.S. Cl. 198—460 **15 Claims**

1. Apparatus for accepting a succession of like objects having a similar spatial orientation but arriving with irregular timing from one object to the next, and outputting the objects in succession with both a similar spatial orientation and a regular spacing from one object to the next, while conveying the objects along a path,

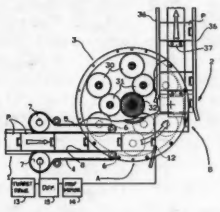
said apparatus comprising:

a first conveyor having a first conveying surface extending along said path from an accepting end to a delivery end of said first conveyor, and means for advancing said first conveying surface in a downstream direction, for advancing a succession of like objects having a similar spatial orientation but arriving with irregular timing from between objects, from said accepting end to said delivery end of said first conveyor;

a second conveyor having a second conveying surface extending along said path, downstream of said first conveyor, from an accepting end to a delivery end of said second conveyor, and means for advancing said second conveying surface in a downstream direction, for advancing a succession of like objects having a similar spatial orientation and placed thereon proximally of said accepting end of said second conveyor, with regular spacing between objects;

a continuously rotating turret mounted for continuous rotation about an axis which carries successive peripheral portions of said turret along said path so that such successive peripheral portions are each successively juxtaposed with said delivery end of said first conveyor and said accepting end of said second conveyor;

each said peripheral portion carrying a respective pick-up head for picking up an object which has been conveyed to said delivery end of said first conveyor and delivering and depositing that object onto said second conveyor;



a braking means juxtaposed with said first conveyor beside said delivery end of said first conveyor, for engaging objects successively conveyed into proximity therewith on said first conveying surface, said braking means comprising a pair of endless belts having object-engaging runs which transversally-spacedly confront one another across path in juxtaposition with said first conveyor, and variable speed means for running said belts so that the object-engaging runs thereof advance at a controlled speed which is continuous, but slower than that of said first conveying surface, whereby the succession of like objects being conveyed by the first conveyor becomes condensed into a single file of serially engaged objects including an advancing leading said object which becomes positioned to be picked-up by a respective pick-up head as said turret rotates; and

means responsive to spatial positioning of successive ones of said leading objects in relation to rotation of said turret, for adjusting the speed of said means for running said belts, for causing each said leading object, while continuously advancing, to become located at an appropriate location to be picked-up by a next said pick-up head as such pick-up head becomes ready to pick-up the respective leading object.

4,883,164

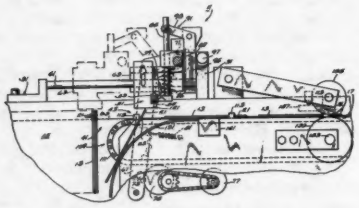
VACUUM OPERATED TRANSFER MACHINE

Paul Korzenecki, Benton Harbor, Mich., assignor to Mac Engineering & Equipment Company, Inc., Benton Harbor, Mich.

Filed Jun. 8, 1988, Ser. No. 203,883
Int. Cl.[4] B65G *37/00*
U.S. Cl. 198—468.4 **21 Claims**

1. Apparatus for transporting battery plate grids which

include a lug, and which are transported from a magazine for delivery from said apparatus, said apparatus comprising a frame including a rail supporting a grid lug for movement of the grid lug along said rail from a pick-up station adjacent the magazine, through and to a second station spaced from said pick-up station, a suction cup, means on said frame for supporting said suction cup for movement of said suction cup parallel to said rail and from a first position wherein said suction cup engages the grid lug at said pick-up station and to a second



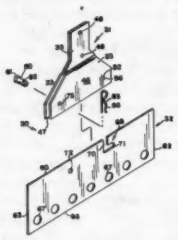
position spaced from said first position, for movement of said suction cup transversely to said rail from said second position to a third position, and thereafter for return movement of said suction cup to said first position, and means connected to said suction cup for applying suction at said suction cup during movement of said suction cup from said first position to said second position so as to retain the grid lug in engaged relation with said suction cup and so as thereby to transport the grid along said rail in common with movement of said suction cup from said pick-up station to said second station.

4,883,165

HANGER FOR PAINT CONVEYOR LINE

Richard D. Neiman, Chester Springs, Pa., assignor to Vesper Corporation, Bala-Cynwyd, Pa.

Filed Jul. 8, 1988, Ser. No. 221,958
Int. Cl.[4] B65G *17/32*
U.S. Cl. 198—682 **2 Claims**



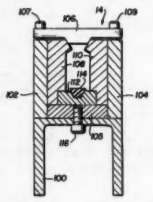
1. In an endless traveling conveyor for carrying articles to be painted through a spray paint field having
(1) a fixed track;
(2) roller arms on the track;
(3) a traveling flexible member secured to the roller arms; and
(4) hangers secured to and depending from the roller arms having holes therein for suspending the articles;
the improvement comprising
a hanger having
(1) an upper element
(a) secured at its upper section to roller arms, and having
(b) a lower section having a channel extending therein and having a uniform width;
(2) a lower element in the form of a rectangular plate, extending in a vertical plane, having horizontally spaced holes therein;
the thickness of the plate conforming generally to the thickness of the channel, and
(3) means for removably securing the lower element partially within the channel of the upper element, comprising
(a) a fixed plug in the upper element that receives a slot in the lower element to form an initial pivotal connection between the elements, and
(b) matching holes in the upper and lower elements for receiving a removable pin after the pivotal connection is made and the lower element is rotated to line up the holes;
wherein the holes in the lower element are located outside the upper element when the lower element is secured in the upper element.

4,883,166

CONVEYING SYSTEM

Charles F. Whitaker, Bristol, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Sep. 9, 1985, Ser. No. 774,013
Int. Cl.[4] B65G *15/42*
U.S. Cl. 198—688.1 **7 Claims**



1. A conveyor system for transporting relatively thin articles in their upright position as a continuous stick without gaps between adjacent articles comprising a channel, said channel having a pair of stationary sidewalls and a bottom wall, said sidewalls conforming generally to the shape of said articles in their upright position and providing lateral support to said articles to thereby prevent significant side-to-side movement of said articles, said bottom wall including an endless belt therein, and means for driving said endless belt and providing driving force to said articles, said endless belt having spaced transverse grooves therein to provide additional driving force to certain of said articles in said continuous stick to thereby prevent slippage of said articles and gaps in said continuous stick.

4,883,167

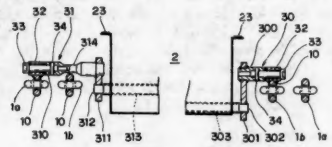
CONTINUOUS CONVEYOR APPARATUS

Katsuaki Shibata, 845-38, Ogoori, Tsuko, Fukuoka, Japan

Filed Sep. 8, 1987, Ser. No. 93,881
Claims priority, application Japan, Sep. 19, 1986, 61/221643; Jun. 17, 1987, 62/149058
Int. Cl.[4] B65G *17/36*
U.S. Cl. 198—712 **3 Claims**

1. A continuous conveyor apparatus having at least one zone of horizontal movement and at least one zone of vertical movement, comprising, in combination, a pair of inner link chains and a pair of outer link chains, a plurality of carrying vessels each having a front end and a rear end, front connecting means mounting the front ends of said carrying vessels between said inner link chains, rear connecting means mounting the rear ends of said carrying vessels between said outer link chains, said chains being mounted upon a plurality of tandem wheel means and coaxial wheel means in such a manner that at least one tandem wheel means is mounted at the junction between a horizontal zone and a vertical zone; each said tandem wheel

means comprising a pair of inner wheels each wheel mounted in cantilever on an inner shaft, said inner shafts being coaxially aligned, a pair of outer wheels each wheel mounted in cantilever on an outer shaft, said outer shafts being coaxially aligned with each other and horizontally aligned with and spaced from said inner shafts, each said coaxial wheel means comprising a pair of inner wheels and a pair of outer wheels all mounted on a common shaft, said link chains being of simple construction, through which lubricant generally sufficiently penetrates to provide better abrasion resistance than roller chains, and



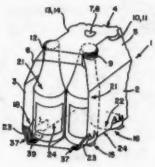
adapted to high speed, compactness, and twisting in three dimensions, each of said link chains comprising an endless sequence of alternating vertical links and horizontal links, said front connecting means and said rear connecting means each being connected with the outer side of the straight portion of a vertical link, wherein said connection to the outer side of the straight portion of a vertical link of said outer link chains includes a cylindrical fitting, mounted directly onto said outer side of said straight portion, within which said rear connecting means is rotatably mounted.

4,883,168

REINFORCING CORNER FLAP FOR GROUP PACKAGES

Roger Dreyfus, Strasbourg, France, assignor to I.C.P., S.A., Fegersheim, France

Filed Aug. 3, 1988, Ser. No. 227,856
Claims priority, application France, Aug. 3, 1987, 87 11100
Int. Cl.[4] B65D 5/04
U.S. Cl. 206—152 **19 Claims**



1. Protective and reinforcing flap means incorporated within a wrapping type package for housing a plurality of containers, wherein said package includes cut-out means, for retaining said plurality of containers within said package, formed within bottom and sidewall panels of said package and extending across fold lines defined between said bottom and sidewall panels of said package; intermediate connecting strips interconnecting said bottom and sidewall panels of said package by extending across said fold lines defined between said bottom and sidewall panels of said package, and separating said cut-out means; and end strips interconnecting said sidewall and bottom panels of said package by extending across said fold lines defined between said bottom and sidewall panels of said package, and interposed between end ones of said cut-out means and exterior side edges of said package, said protective and reinforcing flap means comprising:

a flap formed within each one of said end cut-out means and interconnecting said bottom and sidewall panels of said package by extending across said fold lines defined between said bottom and sidewall panels of said package;

fold line means defined between each one of said flaps and each one of said end strips for permitting each one of said flaps to be folded over each one of said end strips whereby an outer edge portion of each one of said folded flaps is substantially aligned with an outer edge portion of each one of said end strips which define said exterior edges of said package such that said end strips of said package, within the vicinity of said containers and within corners of said package as defined along said fold lines between said bottom and sidewall panels of said package, are reinforced by means of a double-thickness of material forming said package panels; and

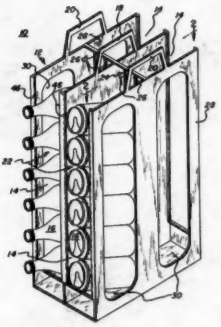
means for bonding each one of said flaps to each one of said end strips so as to secure each one of said flaps to each one of said end strips so as to insure said double-thickness reinforcement of said package within said exterior edge regions of said package.

4,883,169

PORTABLE RECEPTACLE FOR RETURNABLE BEVERAGE CONTAINERS

Richard E. Flanagan, Jr., P.O. Box 217, West Sand Lake, N.Y. 12196

Filed Dec. 19, 1988, Ser. No. 286,167
Int. Cl.[4] B65D 5/36, 6/40, 71/00
U.S. Cl. 206—170 **16 Claims**



1. A receptacle for storing and transporting returnable beverage containers, said receptacle comprising:

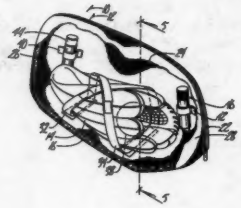
portable frame structure, said structure having at least one module sized to receive a plurality of returnable beverage container, said at least one module having an outwardly facing open end and an at least partially sealed end opposed thereto, said open end allowing positioning of said plurality of containers within said at least one module, said at least one module including means for orienting said containers within said module such that the containers are angled downwardly from said open module end to said at least partially sealed end, said at least one module being sized such that said containers remain so angularly orientated when stored and when transported within the receptacle, whereby residue fluids within said containers remain therein when the containers are positioned within said module with their tops facing outward at said open end of said module, and said orienting means enhances retention of said beverage containers within said at least one module when said receptacle is utilized to transport said containers.

4,883,170

BALL GLOVE CONDITIONING BAG

Robert L. Wright, Des Moines, Iowa, assignor to Creative Athletic Products and Services, Inc., Des Moines, Iowa

Filed Jun. 27, 1989, Ser. No. 371,748
Int. Cl.[4] B65D *85/18, 81/22*
U.S. Cl. 206—315.1 17 Claims



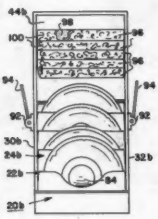
1. A ball glove and glove conditioning bag comprising,
a bag having a chamber defined by a bottom wall and side walls, and an access opening into said bag,
a ball glove in said chamber,
fastening means in said bag for holding said glove stationary and substantially centered between said side walls,
a conditioning fluid applicator ball in the pocket of said glove, and
said fastening means holding said glove in a wrapped-around-said-ball relationship whereby conditioning fluid may be transferred from said ball to said glove.

4,883,171

ANIMAL CALL DEVICE HOLDER AND ASSEMBLY

Wayne Carlton, 206 Lynch St., Edgefield, S.C. 29824

Filed Oct. 21, 1988, Ser. No. 260,499
Int. Cl.[4] B65D *85/00*
U.S. Cl. 206—315.11 13 Claims



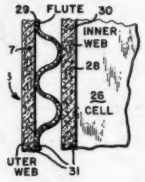
1. An improved animal call device holder, said holder comprising, in combination:
a. a container having a rhomboidal configuration in side elevation with wedge-shaped lower and upper ends to facilitate insertion into and withdrawal from a pocket, said container having a bottom portion comprising a generally flat closed bottom and upraised, integral closed front, rear and sides sloped upwardly rearwardly to provide said wedge shape and defining a lower storage space therewith, and an openable lid for said container, hinged to said bottom portion and having a closed flat top and depending closed integral sides, front and rear defining an upper storage space sloped downwardly forwardly to match the slope of said bottom portion to provide said wedge shape and defining an upper storage space; and,
b. a rack disposed in said container bottom portion and comprising a plurality of spaced parallel upwardly and rearwardly sloping plates connected to said bottom portion sides and/or bottom, and defining a plurality of pockets adapted to separately releasably hold the lower portions of generally flat animal call devices, said upper space being adapted to hold the upper portion of said animal calls.

4,883,172

CONTAINER FOR STATIC-SENSITIVE ARTICLES

William I. Young, North Situate, Mass., assignor to Hy-Con Products, Inc., Framingham, Mass.

Continuation of Ser. No. 860,499, May 7, 1986, Pat. No. 4,712,674, which is a continuation of Ser. No. 715,203, Mar. 25, 1985, Pat. No. 4,610,353. This application Oct. 29, 1987, Ser. No. 114,564
The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.
Int. Cl.[4] B65D *73/02*
U.S. Cl. 206—328 1 Claim



1. Container for use with an article which can be damaged by static electricity, comprising:
a plurality of walls forming a Faraday cage in which the article resides, each wall of the cage consisting of a sheet of corrugated board, which board has at least an outer web, an inner web, and a corrugated flute web that is sandwiched between the inner and outer webs, at least one of the webs being provided with a substantially uniform electrically-conductive dispersion of conductive particles, wherein the said dispersion of conductive particles extends continuously through the said conductive web from one of its surfaces to the other of its surfaces and wherein the walls of the cage have a surface conductivity and bulk conductivity in the range from 10^3 to 10^9 ohms/square.

4,883,173

HYPODERMIC NEEDLE REMOVAL AND DISPOSAL DEVICE

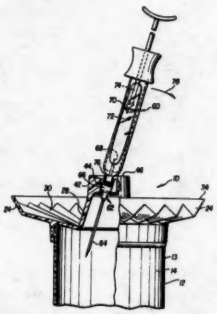
Diana L. Goldman, and Michael S. Goldman, both of 5109 Foxon Rd., Virginia Beach, Va. 23464

Filed Jun. 1, 1989, Ser. No. 359,577
Int. Cl.[4] B65D *25/00*
U.S. Cl. 206—366 11 Claims

1. A hypodermic needle removal and disposal device for detaching hypodermic needle assemblies, including needles and hubs, from hypodermic syringes, said device comprising:
an elongated storage container having closed side and bottom walls and an open top, the side wall of said storage container having an outer surface of a size and shape that it can be gripped by a single normal-size human hand and held in an upright attitude;
a needle-removing shield permanently mounted at the top of said elongated storage container for closing said open top, said needle-removing shield comprising an apron extending laterally outwardly substantially beyond the outer surface of said side wall, said apron having a funnel-shaped top surface facing away from said storage container, said funnel-shaped top surface slanting toward a plateau, said plateau rising over the funnel shaped top surface to form a plateau surface above said funnel-shaped top surface and defining an elongated hole in said plateau surface of a relatively uniform dimension along the length

thereof and being of a size for closely receiving a hub of a hypodermic needle;

whereby a hypodermic needle mounted on threads of a hypodermic syringe can be inserted through said elongated hole, so that said hub of said hypodermic needle is positioned in said elongated hole, said hypodermic syringe can be turned as a lever about said hypodermic needle



hub, which is held from turning by a wall defining said elongated hole, thereby ripping threads of said syringe out of engagement with said hub and allowing said hypodermic needle to fall into said elongated storage container, said funnel shaped top surface serving as a shield for a hand holding said elongated container and guiding needles contacting it toward said plateau.

4,883,174

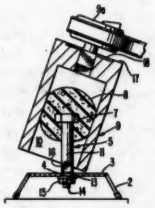
WRENCH SOCKET ASSEMBLY

Ralph F. Reeside, 4316 Leland St., Chevy Chase, Md. 20815

Filed Nov. 14, 1988, Ser. No. 270,811

Int. Cl.[4] B65D *85/20*

U.S. Cl. 206—378 **8 Claims**



1. A wrench socket assembly comprising stud means removably mounted on a supporting surface for holding wrench socket means with drive ends exposed for engagement by a wrench handle, said stud means having molded thereon an elastomeric spherical ball selectively and compressibly fittable in a work opening of and firmly gripping one of said socket means, wherein the socket means are a plurality of sockets having work openings of different cross-sectional area, and each socket is swivelable relative to the elastomeric ball fitting its work opening for accommodating relative angling of a wrench handle in applying and removing a socket to and from one of said stud means.

4,883,175

SUSPENSION DEVICE FOR A CONTAINER

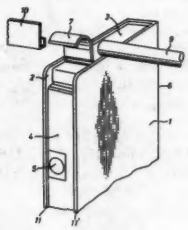
Hartmut Thiele, Munich, and Heinz Mauser, Gilching, both of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 12, 1988, Ser. No. 155,564

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1987, 8702812

Int. Cl.[4] B65D *85/00*

U.S. Cl. 206—387 **6 Claims**



1. A rectangular case for audio and video recording tape consisting of a base, lid and means for receiving recording tape, and having in combination,

two major side walls,

a face wall extending around three sides of said rectangular case and positioned between said walls so as to separate the side walls by the lateral dimension of the face wall,

said face wall consisting of two end sections separated by a front face wall section,

a rim on each of said side walls extending around the three sides of the case adjacent to the face wall, said rims extending beyond said face wall,

a recess provided in said face wall by said extending rims,

a hinged bracket with a hooked free end pivotally mounted on one of said face wall end sections for movement between an open position so that said hooked free end is engageable to provide support for the case, and a closed position in which the hinged bracket is retained within the recess,

said bracket extending the full lateral dimension of the face wall from rim to rim.

4,883,176

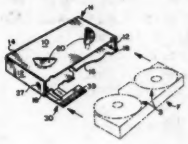
PAPERBOARD VIDEO CASSETTE HOUSING

Joseph J. Hart, Philadelphia, and Christine S. Springman, Downington, both of Pa., assignors to Container Corporation of America, Clayton, Mo.

Filed May 15, 1989, Ser. No. 351,587

Int. Cl.[4] G11B *23/087, 23/04*

U.S. Cl. 206—387 **9 Claims**



1. In a composite, limited use, video cassette, a conventional operating mechanism, formed primary of molded plastic material and including a frame carrying a pair of tape reels and control elements engagable with related elements of a video cassette recording device for driving and braking said reels,

and a housing enclosing said operating mechanism, said housing being formed from a unitary blank of foldable sheet material such as paperboard and comprising:

(a) a pair of first and second side wall walls spaced from each other and interconnected by a front wall and a pair of end walls foldably joied to corresponding front side edges and end edges, respectively, of said side walls to form a box-like structure open at the rear;

(b) a retaining member extending between said side walls across the rear of said housing to retain said operating mechanism in said housing;

(c) one of said side walls having a pair of openings affording access to said tape reels;

(d) the other of said side wall having a pair of spring tabs cut from from material thereof and folded inwardly therefrom between said other side wall and said tape reels to bias the latter toward said one side wall.

4,883,177

PLATE MOUNTABLE ON THE BASE OF A BIN-TYPE CONTAINER FOR THE ORDERED STORAGE OF BOBBINS

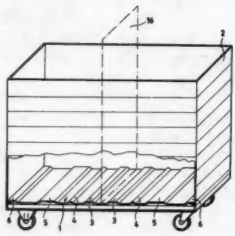
Benito Galbani, Pordenone, Italy, assignor to Savio S.p.A., Pordenone, Italy

Filed Sep. 15, 1988, Ser. No. 244,709

Claims priority, application Italy, Sep. 25, 1987, 22422/87[U]

Int. Cl.[4] B65D *85/66*

U.S. Cl. 206—391 **4 Claims**



1. A bin-type container for storing different bobbins therein, comprising a base plate including two end projections and a plurality of intermediate projections therebetween wherein at least two of said intermediate projections have a substantially cuspidal cross section and at least a further two intermediate projections have a substantially trapezoidal cross section, and wherein two adjacent intermediate projections are spaced a distance apart, all for limiting movement of the bobbins stored in the bin.

4,883,178

MULTIPLE PACKING FOR MAGNETIC TAPES WOUND ON CORES

Hartmut Thiele, and José Toral, both of Munich, Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkuse, Fed. Rep. of Germany

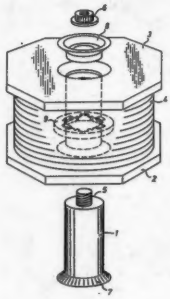
Filed Dec. 2, 1988, Ser. No. 279,401

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1987, 8716579[U]; Dec. 16, 1987, 8716580[U]; Mar. 8, 1988, 8803062[U]

Int. Cl.[4] B65D *85/67*

U.S. Cl. 206—391 **10 Claims**

1. Packing for a plurality of recording carriers in the form of tapes wound on flangeless reel hubs which have central bores (so called pancakes), the packing comprising plastic pellets in the form of discs which protect the outer reels of tape each, disc being defined by an outer wall and an inner wall, and a fixing device rising up through the axial bore and having a diameter equal to the internal diameter of the bores in the reel hubs and in the plastic discs, characterised in that the fixing device is a centering sleeve (1, 13, 22) which can be inserted through the outer walls (2, 3) and through the central bores of the reel hubs (9) and has a closure element which co-operates



with another closure element for locking and tightening, the centering sleeve optionally having further elements (7, 8) which prevent rotation of the centering sleeve against the outer walls of the plastic discs on opening or closing of the packing.

4,883,179

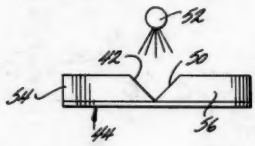
ANGLED PACKING MATERIAL

Pierre A. Dionne, Martinsville, Va., assignor to Pierre Dionne and Southeast Foam Converting & Packaging, Inc., both of Stokesdale, N.C., a part interest

Filed Jan. 6, 1988, Ser. No. 141,147

Int. Cl.[4] B65D *81/02*

U.S. Cl. 206—523 **18 Claims**



1. A packing member in the form of an edge or corner protector, said packing member comprising a plastic foam sheet having a sheet material backing, and said plastic foam sheet having a longitudinal V-groove dividing said plastic foam sheet into two legs connected to one another by a hinge defined by said sheet material backing, said V-groove in combination with said hinge defining means for facilitating folding of said two legs from a planar state to one wherein said two legs are generally at a right angle to one another with the foam of one leg abutting the foam of the other leg, surfaces of said V-groove having an adhesive coating which is a water soluble rubber latex thereon for forming a bond when said legs are folded to bring said surfaces of said V-groove into facing contact.

4,883,180

COLOR CODED MEDICINE CAPS AND LABELS FOR DAILY DOSAGE

Essie Mae Humphrey, and Pete Humphrey, Jr., both of 19802 Dalfsen Ave., Carson, Calif. 90746

Filed Jun. 9, 1988, Ser. No. 204,584

Int. Cl.[4] B65D *83/04*

U.S. Cl. 206—534 **1 Claim**

1. A coded medicine container holding a quantity of medi-

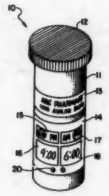
cine to be taken at specific time periods, the combination which comprises:

an open-ended container having an exterior surface carrying a first color;

a cap closure having an exterior surface removably carried on said container to selectively close the open end thereof;

said container having a label carried on said exterior surface imprinted with indicia related to time periods for taking of the medicine;

said cap closure and said label being identical in color to



visually represent said indicia related to the number of times that medicine is to be taken per day;

said container color being different from said cap closure and said label color;

a plurality of raised, non-removable nubs carried on said label correlating with and cooperating with said cap closure and said label color to be indicative of the medication time period of consumption; and

said cap closure and said label color representation and said raised nubs constitute a code correlated to represent said indicia related to medicine-taking times.

4,883,181

FOREIGN SUBSTANCE DISPOSING DEVICE FOR MONEY RECEIVING AND DISBURSING MACHINE

Eiichi Yoshikawa, Hasuda, Japan, assignor to Laurel Bank Machines Co. Ltd., Tokyo, Japan

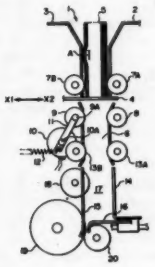
Filed Nov. 10, 1988, Ser. No. 269,648

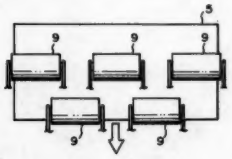
Claims priority, application Japan, Nov. 12, 1987, 62-285736

Int. Cl.[4] B07C *5/00*

U.S. Cl. 209—534 **7 Claims**

1. A foreign substance disposing device for a money receiving and disbursing machine comprising a bill receiving section for receiving a stack of bills to be processed in said machine, pick out means for picking out the bills one by one from the stack, transfer means for transferring the stack of bills from said bill receiving section to said pick out means, transfer drive means for driving said transfer means, detecting roller means swingably provided between said bill receiving means and said pick out means, said detecting roller means being brought into contact with a surface of the stack of bills being transferred, and being operable to produce a swingable movement in response to an undulation of the surface of the stack of bills as the stack of bills are transferred, said undulation being caused by a foreign substance potentiometer means for producing a signal in response to the swingable movement of the detecting roller means, control means for judging whether or not the stack of bills received in the machine are accompanied by a foreign substance based on said signal from the potentiometer means and for controlling said transfer drive means to return the stack





of bills to the bill receiving section when a foreign substance is detected as a result of said judgment.

4,883,182

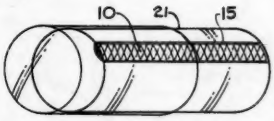
TAMPER EVIDENT CAPSULE AND INSERT DEVICE

Raymond J. Hughes, P. O. Box 801, Mantoloking, N.J. 08738

Filed Jan. 12, 1988, Ser. No. 142,976

Int. Cl.[4] A61K *9/48;* **A61J** *3/07*

U.S. Cl. 206—534 **8 Claims**



1. A tamper-evident capsule, comprising:

a shell;

an insert disposed within said shell and generally visible from outside said shell;

said insert adapted to change its appearance when said shell is subjected to physical stress.

4,883,183

BILL DEPOSITING/DISPENSING APPARATUS

Haruo Kimura; Takeo Ishidate, and Masao Goto, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Oct. 2, 1987, Ser. No. 103,822

Claims priority, application Japan, Oct. 13, 1986, 61-241464

Int. Cl.[4] G06F *15/30;* **G07D** *7/00*

U.S. Cl. 209—534 **2 Claims**

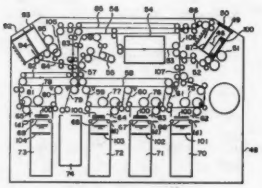
1. A bill depositing/dispensing apparatus comprising:

(a) a normal-bill storage box for storing normal bills;

(b) a marred-bill storage box for storing marred bills;

(c) a rejected-bill storage box for storing rejected bills;

(d) a separator for separating and feeding normal bills from said normal-bill storage box;
(e) a discriminator for detecting whether or not bills are true or false, normal or marred, and for detecting whether a face or a back of a bill is being presented, and for detecting the denomination of the bill, and for detecting abnormal traveling of the bills;
(f) a customer-side bill slot for receiving and dispensing bills;
(g) a first shutter disposed over said customer-side bill slot;
(h) a drive means for opening and closing said first shutter;
(i) a clerk-side bill slot for receiving and dispensing bills;
(j) a second shutter disposed over said clerk-side bill slot;
(k) a drive means for opening and closing said second shutter;
(l) a first feeding means for feeding bills from said customer-side bill slot to said discriminator, said first feeding means including a first roller for separating bills disposed in said customer-side bill slot from said customer-side bill slot, a first table for pressing bills disposed in said customer-side bill slot against said first roller, and a first drive means for moving said first table back and forth;
(m) a second feeding means for feeding bills from said clerk-side bill slot to said discriminator, said second feeding



means including a second roller for separating bills disposed in said clerk-side bill slot from said clerk-side bill slot, a second table for pressing bills disposed in said clerk-side bill slot against said second roller, and a second drive means for moving said second table back and forth;
(n) a third feeding means for feeding normal bills from said discriminator to said normal-bill storage box;
(o) a fourth feeding means for feeding marred bills from said discriminator to said marred-bill storage box;
(p) a fifth feeding means for feeding rejected bills from said discriminator to said rejected-bill storage box;
(q) a sixth feeding means for feeding bills from said discriminator to said customer-side bill slot;
(r) a seventh feeding means for feeding bills from said discriminator to said clerk-side bill slot;
(s) an eighth feeding means for feeding normal bills from said normal-bill storage box to said discriminator; and
(t) a control means for feeding, upon dispensing from said customer-side bill slot, rejected bills which are discriminated as abnormal in traveling by said discriminator from said discriminator to said clerk-side bill slot, and for feeding rejected bills in said clerk-side bill slot to said discriminator.

4,883,184

CABLE ARRANGEMENT AND LIFTING PLATFORM FOR STABILIZED LOAD LIFTING

James S. Albus, 952 W. Stanhope Rd., Kensington, Md. 20891

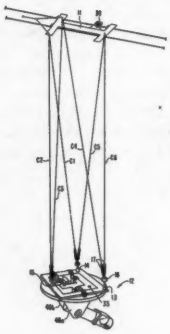
Division of Ser. No. 866,252, May 23, 1986, abandoned. This application Jun. 10, 1988, Ser. No. 205,091
Int. Cl.[4] B66C *13/06, 13/16, 23/72, 11/00*
U.S. Cl. 212—146 **8 Claims**

1. A stabilized load lifting device for use with a crane for lifting and translocating loads, said stabilized load lifting device comprising:

a load platform to secure loads to be lifted, said platform including an attachment frame having first, second and third cable attachment points located such that said third point is along the perpendicular bisector of said first and second points, and load securing means, operatively coupled to said attachment frame, for securing the load to be lifted;

an attachment carriage to operatively couple said load platform to the crane, said carriage including a cable winch having a shaft and means for rotating said shaft, and first, second and third cable pair guides capable of operatively guiding a first and second cable pair downward from said shaft and capable of operatively guiding a third cable pair horizontally away and downward from said shaft;

a first cable pair slidably attached to said first cable pair guide, said first cable pair having first and second cables, one end of said first and second cables coiled about said



shaft near one end of said shaft, the other end of said first and second cables operatively coupled to said second and third attachment points, respectively;

a second cable pair slidably attached to said second cable pair guide, said second cable pair having third and fourth cables, one end of said third and fourth cables coiled about said shaft near the other end of said shaft, the other end of said third and fourth cables operatively coupled to said third and first attachment points, respectively; and

a third cable pair slidably attached to said third cable pair guide, said third cable pair having fifth and sixth cables, one end of said fifth and sixth cables coiled about said shaft near the center of said shaft, the other end of said fifth and sixth cables operatively coupled to said second and first attachment points, respectively.

4,883,185

SUSPENSION TYPE TRANSPORTER FOR A BOLT DRAWING MACHINE AND POSITIONING CONTROLLER THEREFOR

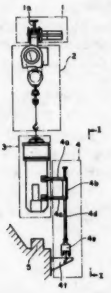
Takashi Fujitani; Hiromi Uemura, both of Osaka; Toshiaki Kishimoto, Fukuoka; Masayuki Uchiyama, Tokyo; Isao Shirasu, Kobe; Hideyuki Kurokawa, Kobe; Takashi Nishioka, Kobe; Kenji Kikukawa, and Yoshinori Sato, both of Kanagawa, all of Japan, assignors to The Hokkaido Electric Power Co., Inc., Hokkaido; The Kansai Electric Power Co., Inc., Osaka; Shikoku Electric Power Co., Inc., Kagawa; Kyushu Electric Power Co., Inc., Fukuoka; The Japan Atomic Power Company, Tokyo; Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo and The Japan Steel Works, Ltd., Tokyo, all of, Japan

PCT No. PCT/JP85/00474, § 371 Date Nov. 2, 1987, § 102(e) Date Nov. 2, 1987, PCT Pub. No. WO87/01364, PCT Pub. Date Mar. 12, 1987

PCT Filed Aug. 28, 1985, Ser. No. 57,908

Int. Cl.[4] B23K *9/12*

U.S. Cl. 212—147 **12 Claims**



1. A suspension type transporter which transports a bolt drawing machine while suspending the bolt drawing machine, comprising:

a guide mechanism including a holding member fixedly mounted to the bolt drawing machine, a cylindrical slide holder mounted vertically to said holding member, a main shaft penetrating said slide holder movably in the vertical direction and rotatably, a wheel support mounted to a lower end of said main shaft, a wheel supported by said wheel support to rotate on a track disposed on a stationary portion at a floor side, a guide provided along the stationary portion, and a guided contact portion disposed to a side surface of said guide to be opposed to said wheel support with a small gap between said wheel support and said contact portion, whereby movement of the bolt drawing machine in the air is restricted.

4,883,186

EASY ERECTING TELESCOPIC MAST

Manuel M. Werber, 41 Brookside Ter., North Caldwell, N.J. 07006

Filed May 2, 1988, Ser. No. 189,338

Claims priority, application Israel, Oct. 28, 1987, 84299

Int. Cl.[4] B66C *23/06*

U.S. Cl. 212—184 **7 Claims**

1. A self-erecting telescopic mast comprising a plurality of hollow concentric mast sections including a bottom/outer mast section and further sections having an increasingly smaller diameter with respect to the diameter of the bottom/-outer mast section;

a mechanical erecting means for erecting each mast section relative to a next outer section, said erecting means comprising an elongated element mounted relative to said bottom/outermost mast section exterior to the mast sections, and a jacking means for movement relative to said elongated element, said jacking means being adapted to travel upwardly along the length of said elongated element and including a second elongated element having clamping means at an upper end thereof for pulling each

mast section upwardly from its next surrounding mast section by clamping the mast section at a top end thereof; and

locking means for fixing each mast section relative to its next adjacent section in erected position.

4,883,187

SOFT DRINK ADVERTISING DEVICE

Peter Knitzer, 165 West End Ave., #4-J, New York, N.Y. 10023

Filed Jul. 17, 1987, Ser. No. 74,871

Int. Cl.[4] B65D *1/00, 41/18;* A47G *19/22, 23/03*

U.S. Cl. 215—1 R **14 Claims**

11. An advertising device substantially proportioned to simulate the shape of a beverage containing can comprising:

(a) a cylindrical glass vessel sidewall defining an internal volume, having an external surface including a simulated label made of ceramic frit which is glazed onto said vessel sidewall and having an upper open portion and a bottom portion;

(b) a bottom member integral with said closing said bottom portion;

(c) said upper open portion of said vessel sidewall having a smaller diameter region coaxial with said internal volume at the uppermost region of said vessel;

(d) a first bead extending along an outside perimeter of said smaller diameter region of said cylindrical vessel sidewall;

(e) a cap comprising a cylindrical sidewall with a top and bottom section having an outside diameter substantially similar to that of said cylindrical vessel sidewall below said smaller diameter region;

(f) said cap further comprising a top member made of plastic incorporating a reflective pigment integral with said cap sidewall, said top member closing the top section of said cap and comprising an embossed raised portion simulating a can opening structure;

(g) a second bead extending along the inside of said bottom section of said cap sidewall dimensioned and proportioned

to engage said first bead such that said cap may repeatedly be secured to and disengaged from said cylindrical vessel sidewall; and

(h) a hole in said top member which coincides substantially with the embossed feature that would open on a functioning "pop-top" can top simulated on said top member.

4,883,188

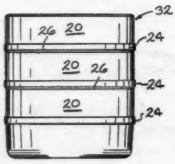
CONTAINER WITH BASE CUP AND PROJECTION TO LIMIT STACKING OF BASE CUPS

John M. Barth, Saline, Mich., assignor to Hoover Universal, Inc., Ann Arbor, Mich.

Continuation-in-part of Ser. No. 934,340, Nov. 24, 1986, abandoned. This application Oct. 27, 1987, Ser. No. 114,092

Int. Cl.[4] B65D *23/08, 21/02*

U.S. Cl. 215—12.1 **5 Claims**



1. A composite container comprising an upright plastic bottle having a generally cylindrical side wall and a cup-shape base portion, a cup-shape base cup member telescoped upwardly over said bottle base portion and arranged in a supporting relation with said bottle, said base cup being formed of blow molded plastic and having a planar bottom portion shaped to sit on a horizontal surface and an upwardly extending tubular wall which terminates at its upper end in an annular rim engaged with said cylindrical bottle side wall, said tubular base cup wall being formed substantially midway between its bottom portion and upper rim with outwardly extending projection means symmetrical with respect to said base cup and having a flat bottom surface extending radially outwardly beyond said rim, said projection means being operable to limit the extent to which an upper and lower pair of said base cups can be nested one within the other with the bottom surface of the projection means on the upper cup engaging the uppermost surface on the lower cup, said surface constituting the rim.

4,883,189

DEVICE FOR HYGIENIC WASTE COLLECTION IN HOSPITALS, LABORATORIES AND SIMILAR ESTABLISHMENTS

Johannes Löbbert, Herteler 54, D-4420 Coesfeld, Fed. Rep. of Germany

PCT No. PCT/EP87/00702, § 371 Date Jul. 12, 1988, § 102(e) Date Jul. 12, 1988, PCT Pub. No. WO88/03416, PCT Pub. Date May 19, 1988

PCT Filed Nov. 13, 1987, Ser. No. 223,073

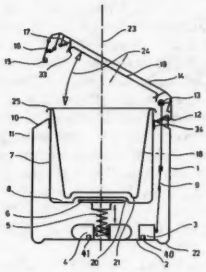
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1986, 8630535[U]

Int. Cl.[4] B65F *1/08*

U.S. Cl. 220—1 T **10 Claims**

1. Disposal equipment for infectious or otherwise contaminated waste, to be used for instance in hospitals, doctors' offices, laboratories and similar institutions; the waste is disposed of in a container (**18**) placed on a support (**1**), and when the container (**18**) is full it is closed tight by means of a lid (**19**) provided,

with the specific feature that the lid (**19**) is held on the support (**1**) by means of a lid holder (**14**) which is actuated by a motorized drive (**3**) and which provides the opening and closing of the container (**18**), while the lid (**19**) is closed down loosely on the container (**18**) during a filling phase,



and that another drive (**4, 5; 27, 28**) linked to the equipment (**1**) closes the lid holder (**14**), with the lid (**19**), down tight onto the container (**18**), and releases the lid (**19**) once the lid (**19**) has been connected to the container (**18**).

4,883,190

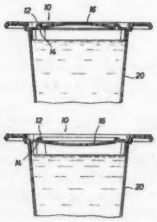
THERMOPLASTIC BELLOWS LID FOR THERMOPLASTIC CONTAINERS

John S. Thomas, Jr., Williamsburg, Va., assignor to Rampart Packaging, Inc., Williamsburg, Va.

Filed Aug. 15, 1988, Ser. No. 231,925

Int. Cl.[4] B65D *6/34*

U.S. Cl. 220—66 **9 Claims**



1. A thermoplastic lid for a thermoplastic container which is subject to paneling caused by the pressure differential which occurs when hot gases in head space of the container condense upon cooling after hot filling, which comprises a flange for attachment to the container and a recessed center portion which has a flex area which is thinner than the rest of the lid and comprises a raised ridge adjacent to the outer edge of the center portion, wherein the stiffness of the lid and the thickness of the flex area are no greater than the maximum which will allow the top of the lid to flex inwardly to provide the minimum displacement of head space necessary to prevent paneling.

4,883,191

RELEASABLE CHAIN KEEPER

Kean Christensen, 807 Avenue "C" , Billings, Mont. 59102

Filed Oct. 11, 1988, Ser. No. 255,661

Int. Cl.[4] A47F *5/08*

U.S. Cl. 220—83 **7 Claims**

1. A releasable keeper for releasably storing a suspended length of open link chain, comprising:

an open tubular body having an open top end and an at least

partially closed bottom end adapted to receive and contain a gathered length of the chain; and

hanger means on the tubular body adjacent the open top end thereof including a movable finger selectively engageable

with the chain for supporting the body and gathered length of the chain, and for selectively moving to release the chain responsive to a direct downward pull applied to the tubular body to facilitate complete removal of the tubular body from the chain.

4,883,192

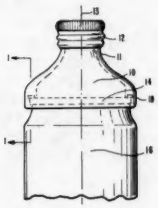
REUSABLE BEVERAGE CONTAINER CLOSURE

Robert Krugman, 3302 Aruba Way, Coconut Creek, Fla. 33066

Filed Oct. 11, 1988, Ser. No. 255,347

Int. Cl.[4] A47G *19/22*

U.S. Cl. 220—85 SP **2 Claims**



1. A bifunctional reusable beverage container closure for sealing an opened metal can containing carbonated liquids which comprises:

a hollow funnel-shaped housing having a longitudinal axis, a spout end axially aligned with said axis, and a skirt end axially aligned with said axis;

spout means axially aligned with said longitudinal axis for recloseably sealing the spout end of said housing, including:

an externally threaded cylindrical spout end, and

an internally threaded removable screw cap operatively disposed on said spout end for hermetically sealing said spout end;

cylindrical skirt means disposed on said skirt end and axially aligned with said axis which includes;

a cylindrical skirt wall end having a skirt hook lower end which operatively engages a crimp bead of said can;

an annular shelf member having an annular gasket groove therein; and

a single annular gasket operatively disposed in said gasket groove for providing hermetic sealing of said housing to said can after it has been opened thereby permitting said carbonated liquids to be stored under pressurized condition.

4,883,193

POWDER PROOF RECLOSABLE LID FOR CONTAINERS

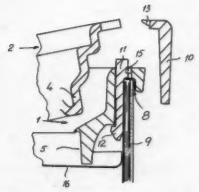
Lars Christensson, Gliavägen, Sweden, assignor to Akerlund & Rausing Licens AB, Jarfalla, Sweden

Filed Sep. 19, 1988, Ser. No. 246,442

Claims priority, application Sweden, Oct. 14, 1987, 8703994

Int. Cl.[4] B65D *41/32*

U.S. Cl. 220—266 **3 Claims**



1. Reclosable lid having a frame (1) adapted to be sealingly secured to the upper part of a container sleeve (9) and having a bore (15) therethrough and a downwardly facing channel (8) for receiving the upper part of the sleeve (9) therein, a securing lid (2), hinge means (3) for connecting the securing lid (2) to the frame (1) to move between open and close portions relative to the frame (1), and tamper proof means cooperating between the sealing lid (2) and the frame (1) for locking the sealing lid (2) in its closed position and including at least one securing pin (11) carried by the sealing lid (2), the one securing pin (11) having a leg and barb (12) projecting inwardly from the leg, and breakable connecting means (13, 14) for connecting the one securing pin (11) to the sealing lid (2), the bore (15) being of such size that the barb (12) can move through it, the barb (12) in the closed position of the sealing lid (2) engaging an edge of the frame (1) to retain the sealing lid (2) in its closed position, and characterized in that the bore (15) opens into the channel (8), the securing pin (11) is located in relation to the bore so that the leg portion thereof engages an outwardly facing portion of the bore (15), the width of the channel (8) in the region of the tamper proof mean being such that said upper part of said container sleeve (9) cooperates in assembly with said reclosable lid to prevent movement of said leg portion outwardly and in a direction away from the sealing lid (2) to release the barb (12) from locking engagement with the frame edge, whereby the securing pin is constantly secured in locking engagement with the frame and the breakable connecting means 13, 14 must be broken to release the sealing lid (2) for hinged movement from its closed to its open position leaving the securing pin (11) in the frame (1).

4,883,194

TEMPORARY CLOSURE FOR USE WITH STORAGE TANKS

Elson G. Fernandes, Kitchener, Canada, assignor to Clemmer Industries Limited, Waterloo, Canada

Filed Dec. 15, 1988, Ser. No. 284,495

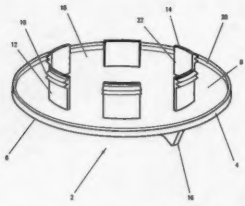
Claims priority, application Canada, Oct. 6, 1988, 579529

Int. Cl.[4] B65D *39/00*

U.S. Cl. 220—307 **6 Claims**

1. A temporary closure for use with an opening in storage tanks or the like, said opening having screw threads located on an inner surface, said closure comprising a cap portion and being made of a slightly flexible but rigid material, said cap portion having an upper and lower surface when said closure is in an upright position, a plurality of spaced apart arcuate threads supports extending away from said lower surface, said supports having screw threads on an outer surface thereof, said screw threads together corresponding to screw threads in the tank opening, said thread supports being arranged to form an

intermittent circle of a size that will fit snugly within the tank opening with the screw threads of the tank engaged with the screw threads of the closure, the upper surface of the cap portion containing means to rotate the closure, the thread supports being flexible enough so that the closure can be



pushed into the tank opening in a longitudinal direction until the lower surface of the cap portion abuts the outer surface of the tank opening and the screw threads of the closure are engaged with the screw threads of the tank, the closure being removable from the tank opening by rotating the closure in an appropriate direction.

4,883,195

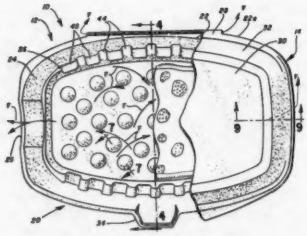
PIZZA CONTAINER

Edward L. Ott, Smyrna, Ga.; Timothy F. Conway, Riverside, and Thomas S. Kubala, Chicago, both of Ill., assignors to Restaurant Technology, Inc., Oak Brook, Ill.

Filed Nov. 2, 1988, Ser. No. 265,856

Int. Cl.[4] B65D *85/36*

U.S. Cl. 220—339 **22 Claims**



1. A container suitable for containing pizza comprising:
(a) a base;
(b) a plurality of raised dimples on said base for supporting said pizza thereon while defining a cavity for air flow between said pizza and said base;
(c) an upwardly extending wall formed along the periphery of said base;
(d) a cover capable of removably coupling to said wall to define a chamber for containing pizza, a portion of the bottom edge of said cover extending outward from and not contacting said wall to form a vent for the exchange of air between said chamber and the exterior of the container; and
(e) said base including a raised elongated boundary enclosing said dimples, said base further including a depression along at least a portion of said elongated boundary on the said opposite said dimples.

17. A container for food comprising:
(a) a bottom including a base;
(b) support means on said base for supporting the food above the base while defining a cavity between the food and said base; and
(c) finger guides also located on said base for guiding a person's fingers between the food and said base; and
(d) an elongated, raised boundary on said base surrounding said support means, said finger guides forming part of said boundary.

4,883,196

HEAT-INSULATING PACKAGING BOX

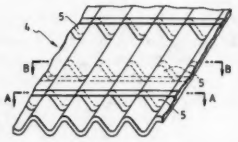
Eiji Kato, Yokohama; Katsumi Kuboshima, Fuji, and Tomoyuki Kaneko, Shizuoka, all of Japan, assignors to Shizuoka Prefectural Government, Shizuoka and Nihon Dimple Carton Co., Ltd., Tokyo, both of, Japan

Filed Sep. 12, 1988, Ser. No. 243,470

Claims priority, application Japan, Sep. 11, 1987, 62-226549

Int. Cl.[4] B65D *1/00*

U.S. Cl. 220—415 **24 Claims**



1. A heat-insulating packaging box which comprises: a planar liner; a corrugated core of corrugated card-board having a plurality of grooves; and a plurality of blocking partitions located at spaced intervals between said core and said planar liner for preventing air from moving in the grooves of the corrugated core having said blocking partitions.

4,883,197

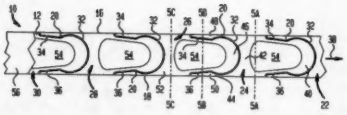
SAMPLE STRIP AND DISPENSING APPARATUS THEREFOR

Hernando Sanchez, New York, N.Y.; Richard M. Franczak, Laurence Harbor, N.J., and Menachem Futter, Staten Island, N.Y., assignors to Revlon, Inc., New York, N.Y.

Filed Sep. 18, 1987, Ser. No. 98,279

Int. Cl.[4] B65H *3/58*; G07F *11/00*

U.S. Cl. 221—26 **59 Claims**



1. A strip in combination with a dispenser, the dispenser including a dispensing tip and a pair of force-exerting members adapted to exert a force against said strip as said strip passes through the dispensing tip, said strip comprising a pair of side edges and dividing lines which extend across said strip from one of said side edges to the other of said side edges and which are spaced apart along the length of said strip such that said strip is divided into a plurality of individual pieces arranged seriatim and connected in end-to-end fashion, each of said pieces containing a sample and including a nose section which has a size and shape selected such that said nose section is spaced from both of said side edges of said strip, a midsection which extends rearwardly from said nose section to a nose section of a trailing piece and which extends across said strip from one of said side edges to the other of said side edges, and a tail section which includes a pair of legs extending rearwardly from said midsection to a midsection of the trailing piece, one of said legs being arranged adjacent to one of said

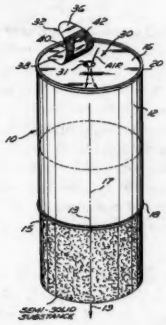
side edges of said strip and the other of said legs being arranged adjacent to the other of said side edges of said strip such that said legs straddle the nose section of the trailing piece so as to present contact surfaces for the force-exerting members of the dispenser as the strip passes through the dispensing tip, whereby the force-exerting members do not exert any substantial force on the trailing piece until the midsection of the trailing piece reaches the force-exerting members at which time the leading piece can be separated from the trailing piece along one of said dividing lines by pulling on the leading piece as the trailing piece is maintained substantially stationary due to the force exerted on the midsection thereof by the force-exerting members, and both of said legs having a length selected such that upon the separation of the leading piece from the trailing piece the nose section of the trailing piece, which now becomes a leading piece, projects outwardly from the dispensing tip a distance sufficient to permit it to be gripped by a user.

4,883,198

CONTAINER AND METHOD FOR DISPENSING SEMI-SOLID SUBSTANCES

Wayne E. Manska, 1921 Kellog Dr., Anaheim, Calif. 92807

Filed Oct. 6, 1987, Ser. No. 106,716
Int. Cl.[4] B67B 7/24
U.S. Cl. 222—1 **8 Claims**



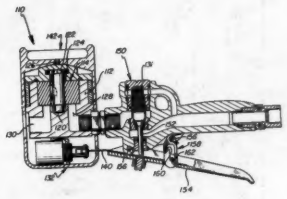
1. A container comprising first and second ends, and a side wall, said container being filled with a semi-solid substance, said first end being mechanically fastened to said side wall and being removable to provide a mouth for dispensing said semi-solid substance along an axis of flow, said axis extending from one end of said semi-solid substance to another end of said semi-solid substance, said mouth having a cross-sectional area which is at least as large as that of other portions of the container to permits said semi-solid substance to slide out of said container, said cross-sectional area being in a section perpendicular to said axis of flow, said semi-solid substance (a) being sufficiently viscous and cohesive to prevent air from readily flowing from said mouth to said second end, thereby producing a vacuum retention force on said substance, and (b) being sufficiently heavy and having sufficiently low adhesive bonding to said side wall such that after release of said vacuum retention force, said semi-solid substance will slide out of said container without the aid of a machine or device, said container additionally comprising a seal-breaking opening structure attached to said second end of said container, adjacent to said another end of said semi-solid substance, said seal-breaking opening structure comprising a peelable thin film covering a hole formed in said container at said second end, said seal-breaking opening structure being responsive to force applied thereto by a user to provide a vent area in said second end to release said vacuum retention force.

4,883,199

FLUID DISPENSING DEVICE

Vernon K. Ouarve, Minneapolis, and Dennis L. McCormick, Mendota Heights, both of Minn., assignors to Graco Inc., Minneapolis, Minn.

Continuation of Ser. No. 78,917, Jul. 28, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 300,484
Int. Cl.[4] B67D 5/30
U.S. Cl. 222—14 **12 Claims**



1. A fluid dispensing unit for dispensing a predetermined volume of fluid, said unit comprising:
- a rotary positive displacement measuring means having an inlet and an outlet;
- a valve connected to said measuring means, said valve having an open position and a closed position inlet;
- actuating means for opening said valve;
- means for biasing said valve in a closed position;
- means for latching said valve in an open position;
- means for releasing said latch means in response to the passage of said predetermined fluid volume through said measuring means said release means comprising:
  - a solenoid, said solenoid being unbiased; and
  - a battery power source, said power source powering said measuring means and energizing said solenoid, said solenoid releasing said latch means upon dispensing of said predetermined volume of fluid.

4,883,200

THERMOPLASTIC MELTING APPARATUS WITH A LEVEL INDICATOR

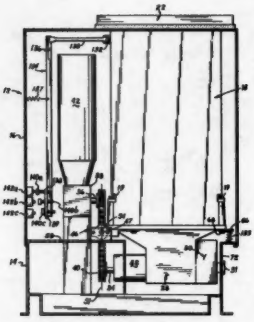
Scott R. Miller, Roswell, Ga., and Robert A. Dunn, Westlake, Ohio, assignors to Nordson Corporation, Westlake, Ohio

Continuation-in-part of Ser. No. 114,437, Oct. 29, 1987, Pat. No. 4,821,922. This application Sep. 28, 1988, Ser. No. 249,545
The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.
Int. Cl.[4] G01G 13/00
U.S. Cl. 222—77 **13 Claims**

9. Apparatus for converting solid thermoplastic material to molten thermoplastic material, comprising:
- a housing having an interior formed with an open top, said housing having a top cover for opening and closing said interior;
- a tank mounted within said interior of said housing, said tank being formed with an interior adapted to receive thermoplastic material, said tank having a lid for opening and closing said interior;
- connector means for mounting said lid of said tank to said cover of said housing so that said lid is protected from forces applied to said cover in a direction toward said interior of said tank;
- melting means connected to said tank for melting the solid thermoplastic material therein to form molten thermoplastic material;
- pump means communicating with said melting means for pumping molten thermoplastic material;
- drive means having linkage drivingly connected to said pump means, said linkage producing a drive force for

operating said pump means acting between said drive means and said pump means;

pivot means connected to one side of said tank for permitting pivotal motion of said tank, said pivot means having a pivot axis located in a plane containing said drive force produced by said linkage;



level indicator means connected to said tank for sensing the extent of said pivotal motion of said tank and providing a corresponding measurement of the quantity of thermoplastic material carried within said tank.

4,883,201

MATERIALS HANDLING EQUIPMENT

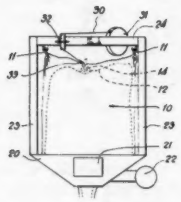
Barrie Poulton, Cheltenham, England, assignor to Flomat Ltd., England

Filed Apr. 19, 1988, Ser. No. 183,642

Claims priority, application United Kingdom, Jun. 8, 1987, 8713392

Int. Cl.[4] B65D 35/56

U.S. Cl. 222—105 6 Claims



1. Apparatus for discharging particulate solid material from an intermediate bulk container in the form of an outer bag having an inner liner comprising frame members having means to which an upper end of said outer bag can be anchored, means for removing slack from said inner liner by withdrawing said inner liner from said outer liner, said means comprising a reel having resilient return means and a cord means on said reel and extendable against the action of said resilient return means and adapted to be connected with an upper end of the inner liner.

4,883,202

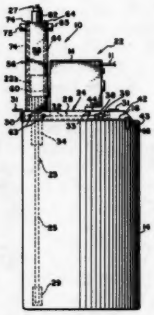
LIQUID PUMPING SYSTEM

Arthur A. Wahl, 6205 Broughton, St. Charles, Mich.

Filed Jan. 20, 1988, Ser. No. 146,197

Int. Cl.[4] B05G 1/28; B67D 5/40

U.S. Cl. 222—109 25 Claims



1. Apparatus for dispensing liquid from a liquid container comprising

a liquid pump;

a feeder hose coupled to a portion of said pump for conveying liquid from said container to a remote location including a first hose section extending from said container to said pump and a second hose section extending from said pump to said remote location; and

liquid recovery means enveloping said feeder hose and said portion of said pump and sealed to a downstream portion of said second hose section for confining and recovering any liquid inadvertently emitted from said feeder hose and directing same to said container.

4,883,203

DISPENSING STORAGE CONTAINER AND ASSEMBLY FOR LAUNDRY TREATMENT MATERIAL

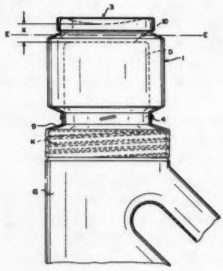
Peter Kittscher, Kaarst, Fed. Rep. of Germany, assignor to Henkel Kommanditgeschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed May 24, 1988, Ser. No. 197,870

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1988, 3804665

Int. Cl.[4] B67D 5/60

U.S. Cl. 222—143 10 Claims



1. In a dispensing storage container for accommodating and dispensing a laundry treatment material within a washing machine or the like, comprising a shell housing having an

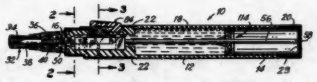
interior compartment and having an open filling end, a cover having a face containing relatively small media for transfer holes, and holding means for securing the cover over the filling end of the container shell housing for the dispensing of laundry treatment liquid through the transfer holes during use, the improvement wherein the shell housing comprises a wide shell housing having a side wall, a base end and an open, relatively wide filling end surrounded by a cylindrical annular collar spaced radially-inwardly from the side wall, releaseable holding means on said collar, and said cover having a contoured face providing a recessed funnel area containing relatively small media transport holes at the base of said recessed area, and having a depending cylindrical skirt which is designed to overlap and be releaseably fastenable to the holding means on the collar to secure the cover over the filling end of the container, said container, without the cover over the filling end thereof, being designed to be secured over the conventional some bottle cap having an outwardly-extending lower cap flange of a bottle of laundry treatment liquid by the reception of the dome bottle cap within the shell housing of the container and the supporting engagement of the annular collar at the wide filling end of the container with the flange of a said dome bottle cap.

4,883,204

MANUALLY-OPERATED FLUID DISPENSER AND ASSOCIATED CLOSURE CAP

Nathan Kay, Encino; Donald McNab, Long Beach, and Edward Moya, San Gabriel, all of Calif., assignors to Photofinish Cosemetics Inc., Encino, Calif.

Continuation-in-part of Ser. No. 194,840, May 17, 1988. This application Nov. 14, 1988, Ser. No. 270,197
Int. Cl.[4] B67D *5/06*
U.S. Cl. 222—192 **38 Claims**



1. In a fluid dispenser for manually-effected operator-controlled discharge of a stored fluid:

an elongated dispenser housing defining an interior space for storing a fluid dischargeable from the housing, said housing including a fluid discharge opening and a vent opening proximate opposite ends of the housing;

variable length means normally urged to a maximum longitudinal extension between and for concurrently closing said vent opening and sufficiently closing said fluid discharge opening so as to prevent discharge of stored fluid through said discharge opening but permitting predetermined bleeding of fluid from the housing interior space through the discharge opening; and

fluid discharge actuating means operatively movable between a first and a second position for causing foreshortening of said variable length means relative to said maximum longitudinal extension to space said variable length means from and concurrently open said fluid discharge and vent openings whereby stored fluid is discharged from said dispenser through said fluid discharge opening and air enters the housing through said vent opening.

4,883,205

INSULATED BOTTLE RACK APPARATUS FOR BICYCLES

William R. Saelens, 313 SE. Uehlamar, and Gary L. Osborne, 2714 NW. 4th Cir., both of Ankeny, Iowa 50021

Filed Feb. 13, 1989, Ser. No. 309,710
Int. Cl.[4] B62J *9/00*
U.S. Cl. 224—32 R **16 Claims**

1. An insulated liquid bottle rack apparatus for bicycles comprising:

means for receivingly holding a bottle, said means defining an interior of a bottle receiving area and an exterior, including a first side, a second side opposite to said first side, and a bottom interconnecting the first and second sides;

means connected to the first side of the bottle holding means for selectively attaching said bottle holding means to a bicycle; and

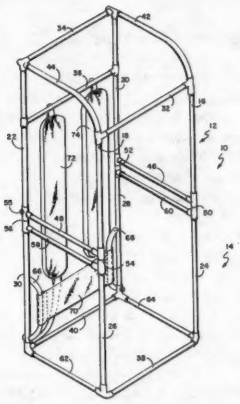
insulation means completely surrounding the exterior of said bottle holding means for insulating the bottle holding area of said bottle holding means.

4,883,206

TENT/COT/BACKPACK STRUCTURE

Irvin W. Miller, 8 Forrestal Dr. NASB, Brunswick, Me. 04011

Filed Oct. 18, 1988, Ser. No. 259,306
Int. Cl.[4] A45F *4/02, 4/04, 4/06*
U.S. Cl. 224—153 **3 Claims**



1. A backpack structure disposed in a generally vertical first mode when used as a backpack, comprising: an upper framework having an outer side and an inner side and a lower framework having an outer side and an inner side, said lower framework being releasably attached to said upper framework; storage areas defined respectively within said upper and lower

framework; storage bags disposed in each storage area; said upper and lower frameworks being separable to form the second mode of use of said structure as a cot when said upper and lower frameworks are horizontally disposed apart from one another on the ground with said outer side the disposed facing upwards; said second mode including a planar cot member attached to the upper facing outer sides of each of said upper and lower frameworks; first and second extension poles attaching said upper and lower frameworks together and supporting said cot member; said backpack structure then disposable in its third mode wherein said lower framework includes a tent pole receipt aperture defined therein; a tent pole structure extending from said tent pole receipt aperture over said cot member to the ground beyond the sides of said cot member; a tent member extending over said tent pole structure, said tent member further including a tent bottom extending under said cot member to provide containment of said cot member within said tent member; and

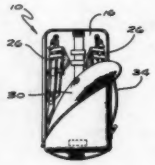
wherein said storage bags of the structure in its first mode contain said first and second extension poles, said tent pole structure and said tent member.

4,883,207

VERSATILE SPORTS PACK

Patrick D. McArthur, 20763 Schoolcraft, Canoga Park, Calif. 91306

Filed Aug. 3, 1988, Ser. No. 227,809
Int. Cl.[4] A45F *4/02, 3/08*
U.S. Cl. 224—153 **19 Claims**



1. A combination luggage and backpack assembly comprising:

a body having side, front, rear, top and bottom walls and defining a storage space;

a plurality of L-shaped support members affixed to said rear body wall and with their short portions extending along said bottom body wall to provide support to the contents of said assembly when it is employed as a backpack;

a plurality of shoulder straps affixed to the outside surface of said rear body wall;

a sealable pouch affixed to the outside surface of said bottom body wall;

a closable flap attached to said rear body wall and adapted to cover the outside surface of said rear body wall, including said shoulder straps, when in its closed position and adapted to be stored in said pouch when in its open position when the assembly is to be used as a backpack;

a shoulder strap affixed to one of said side body walls;

a hand strap affixed to one of said side body walls;

a hand strap affixed to the top of said body walls;

a day pack including means for removably securing said day pack to the outside surface of said front body wall;

means for partially detaching said front body wall from said body thereby permitting access to said storage space;

a briefcase including means for removably securing said briefcase to the inside surface of said front body wall; and

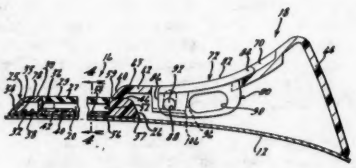
a plurality of sealable pockets disposed within said storage space and affixed to the inside surfaces of said body walls.

4,883,208

VEHICLE DECK RACK WITH POP-UP TIE-DOWNS

John A. Bott, 931 Lakeshore Dr., Grosse Pointe Shores, Mich. 48236

Continuation of Ser. No. 27,836, Mar. 19, 1987, abandoned. This application Sep. 6, 1988, Ser. No. 241,840
Int. Cl.[4] B60R *9/04*
U.S. Cl. 224—316 **16 Claims**



1. In combination in a vehicle article carrier adapted to be mounted on a planar surface of a motor vehicle comprising:

one or more article supporting slats adapted to be coupled with the planar surface and arranged substantially parallel to the planar surface, said one or more slats each having two ends, means for tying down articles to be operably associated with one end of each of said one or slats;

means for deflecting wind, said means for deflecting wind adapted to be associated with the planar surface and oriented substantially transverse to said one or more slats, said wind deflection means forming an opening and having a first upper surface which is arcuate; and

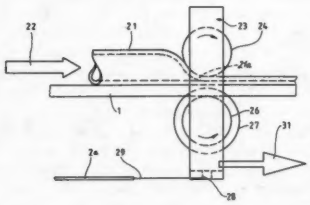
second means for tying down articles to be carried coupled with said wind deflection means, said second means being disposed in said opening and having a second upper surface substantially the same curvature as said first upper surface, said second means for tying down articles pivoting from a first position, wherein said second upper surface of said second means for tying down articles is substantially flush with said first upper surface of said wind deflection means, to a second position wherein said second means for tying down articles projects from said wind deflection means.

4,883,209

APPARATUS FOR THREADING THE LEADERS OF FLEXIBLE WEBS IN A PROCESSING MACHINE

Albert Hebels, Hamburg, Fed. Rep. of Germany, assignor to PAGENDARM Beschichtungstechnik GmbH, Hamburg, Fed. Rep. of Germany

Filed Jun. 24, 1988, Ser. No. 212,202
Claims priority, application Fed. Rep. of Germany, Jul. 7, 1987, 3722345
Int. Cl.[4] G03D *13/10*; B65H *20/16*
U.S. Cl. 226—92 **20 Claims**



1. Apparatus for threading the leader of an elongated flexible body, such as a web of plastic material or paper, into an elon-

gated path, comprising an elongated track adjacent and having an outline at least substantially conforming to that of the path, said track having a first side and a second side; a deformable and inflatable hose adjacent said first side of said track; a follower connectable with the flexible body and mounted on said track so as to deform the adjacent portion of said hose, said follower including a first portion overlying the hose and a second portion at the second side of said track, said hose having an opening at one side of said follower; and means for admitting a pressurized fluid into said hose by way of said opening so that the pressurized fluid inflates the hose at said one side of the follower and the inflated hose propels the follower along said track in a predetermined direction.

4,883,210

MATERIAL FEEDING APPARATUS

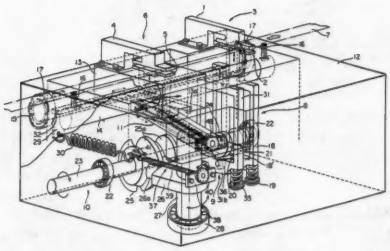
Heizaburo Kato, Shizuoka, Japan, assignor to Sankyo Manufacturing Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 96,094, Sep. 14, 1987, Pat. No. 4,819,850. This application Jan. 24, 1989, Ser. No. 300,874

Claims priority, application Japan, Sep. 22, 1986, 61-224297

Int. Cl.[4] B65H *20/18*

U.S. Cl. 226—100 **13 Claims**



1. A feeding apparatus for sheet material member comprising:

a first gripper device having a first fixed gripper and a first movable gripper for cooperating with each other in clamping and unclamping a material positioned therebetween;

a slide block for reciprocal sliding motion along the feeding path of the material; and

a second gripper device disposed on said slide block opposite the first gripper device having a second fixed gripper and a second movable gripper for cooperating with each other in clamping and unclamping the material positioned therebetween;

means for guiding movement of the material between the second and the first gripping device including a pair of fixed guide members disposed between said second fixed and movable grippers and defining a passage for the material member, each guide member being provided at its opposite ends seen in the direction of the material flow with first and second groups of teeth-like projections and with a gap formed between said first and second groups,

a pair of grip members provided on said second gripper device with one grip member being secured to said second fixed gripper and the other grip member to said second movable gripper, each grip member having at its opposite ends projections which engage into recesses formed between the teeth-like projections of the associated guide member, and a stem portion which extends between said projections of grip member and is in engagement with said gap of the associated guide member; and

wherein a dimension of said gap in the feeding direction of the sheet material is larger than the corresponding dimension of stem portion so that the grip members for feeding the sheet material can be reciprocated in the feeding direction within said guide members.

4,883,211

EXPLOSIVE POWDER CHARGE OPERATED FASTENING ELEMENT SETTING DEVICE

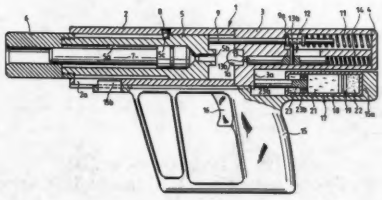
Leo Philipp, Untervaz, Switzerland; Ernst Thuer, and Gerhard Ehmig, both of Rankweil, Austria, assignors to Hilti Aktiengesellschaft

Filed Mar. 3, 1989, Ser. No. 319,425

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806831

Int. Cl.[4] B25C *1/14*; B25D *17/24*

U.S. Cl. 227—9 **5 Claims**



1. Explosive powder charge operated setting device for driving fastening elements in a driving direction into a receiving material, comprising a housing having a front end and a rear end, a handle displaceably mounted on said housing, a damping unit in contact with said housing and said handle, a fastening element guide mounted in the front end of said housing and being displaceable into said housing counter to the driving direction against the force of spring mean biasing said guide in the setting direction, wherein the improvement comprises that said damping unit applies a force acting on said housing greater than the biasing force of said spring means, said handle is shaped as a receptacle for a cylinder forming a part of said damping unit and containing a first fluid medium pressurized by a second fluid medium, and said damping unit includes a first piston located within and extending out of said cylinder and bearing against said housing exteriorly of said cylinder with said first piston being acted on by said first fluid medium within said cylinder.

4,883,212

EXPLOSIVE POWDER CHARGE OPERATED SETTING DEVICE

Leo Philipp, Untervaz, Switzerland, assignor to Hilti Aktiengesellschaft, Fürstentum Liechtenstein, Fed. Rep. of Germany

Filed Mar. 3, 1989, Ser. No. 319,401

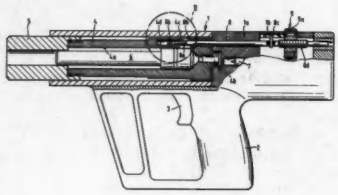
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806834

Int. Cl.[4] B25C *1/14*

U.S. Cl. 227—9 **6 Claims**

1. An explosive powder charge operated setting device comprises a housing, an axially extending barrel axially displaceably mounted in said housing, said barrel having a front end and a rear end with a cartridge chamber in the rear end of the barrel, an outflow opening having a flow cross-section extending through said barrel and communicating with the cartridge chamber for flowing explosive gases outwardly from the barrel, a slide for regulating the flow cross-section of said outflow opening, wherein the improvement comprises an axially extending bore located at least in part within said barrel and extending parallel to the axis of said barrel, said bore traversing said outflow opening, said slide being movably

displaceable in said bore, said slide including a sealing piston located at least in the range of said outflow opening, and means



engaging said slide for slidably displacing said sealing piston within said bore.

4,883,213

EXPLOSIVE DIVING TOOL APPARATUS WITH IMPROVED EXTRACTOR

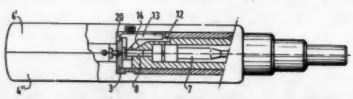
Roland Almeras, Tournon, France, assignor to Societe de Prospection et d'Inventions Techniques (S.P.I.T.), Bourg les Valence, France

Filed Oct. 5, 1988, Ser. No. 253,543

Claims priority, application France, Oct. 28, 1987, 87 14908

Int. Cl.[4] B25C *1/14*

U.S. Cl. 227—10 **11 Claims**



1. Explosive tool driving apparatus, comprising:

a barrel holder;

a barrel movably disposed within said barrel holder between a firing position and an open position;

a propulsive charge case containing a propulsive charge, for generating propulsive gases for propelling a fastener to be driven into a workpiece, and having a collar formed upon a rear portion thereof;

bore means defined within a rear portion of said barrel for housing said propulsive charge case;

notch means defined within said barrel holder for defining first rearward and second forward stops; and

an extractor movably mounted upon said barrel holder between first rearward apparatus-firing and second forward apparatus-opening positions, and having engagement means disposed within said notch means of said barrel holder so as to be interposed between said first and second stops, and an extraction claw for engaging said collar of said propulsive charge case during opening of said apparatus so as to remove said propulsive charge case from said housing bore means of said barrel,

wherein when said apparatus is disposed at said firing position, said extractor is disposed at said first rearward position at which said engagement means of said extractor, disposed within said notch means of said barrel holder, is engaged with said first rearward stop such that a front end portion of said extractor engagement means is spaced from said second forward stop of said notch means so as to define an axial distance (J) therebetween while said extraction claw is spaced from said collar of said propulsive charge case so as to define an axial distance (t) therebetween, while when said barrel is moved toward said open position, said collar of said propulsive charge case engages said extraction claw of said extractor so as to move said extractor forwardly whereby said engagement means of said extractor engages said second forward stop of said notch means so as to prevent further forward movement of said extractor and said propulsive charge case whereby said propulsive charge case is extracted from said bore means of said barrel as said barrel continues to move forwardly toward said open position.

4,883,214

HEATED TOOL WITH HEATED SUPPORT

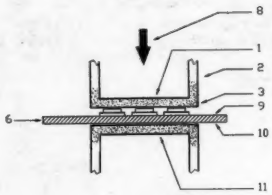
Gero Zimmer, Munich, Fed. Rep. of Germany, assignor to Productech Reflow Solder Equipment Inc., Rolling Hills Est., Calif.

Filed Jul. 6, 1988, Ser. No. 215,625

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1987, 3722730

Int. Cl.[4] B23K *3/00*

U.S. Cl. 228—9 **6 Claims**



1. An apparatus for heating parts to be thermally treated, the parts being supported on a thin substrate, the apparatus comprising a heating tool for heating and applying pressure to the top of the parts which are supported on a thin substrate, and a heated mechanical support under the substrate aligned with the tool for absorbing forces exerted by the tool and for heating the bottom of the substrate to compensate for a temperature gradient produced across the thickness of the substrate by heating of the tool, whereby a low temperature gradient is produced across the thickness of the substrate, said tool and support each comprising a U-shaped structure having a heating portion and a pair of support portions connected to opposite ends of the heating portion.

4,883,215

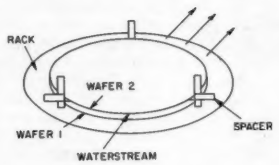
METHOD FOR BUBBLE-FREE BONDING OF SILICON WAFERS

Ulrich M. Goesele, and Reinhard J. Stengl, both of Durham, N.C., assignors to Duke University, Durham, N.C.

Filed Dec. 19, 1988, Ser. No. 286,460

Int. Cl.[4] H01L *21/304*

U.S. Cl. 228—116 **32 Claims**



1. A method for bonding at least two wafers wherein said at least two wafers includes at least one first wafer comprising silicon and at least one second wafer comprising either silicon or glass wherein each of said wafers has at least one mirror-polished surface, including the steps of:

positioning said first and second wafers in closely spaced-apart and parallel relationship to each other and with each

of said wafers having a mirror-polished surface opposing a mirror-polished surface of the other wafer;

introducing a cleansing solution onto the opposing mirror-polished surfaces of said first and second wafers;

flushing said cleansing solution from said mirror-polished surfaces of said first and second wafers;

drying said mirror-polished surfaces of said first and second wafers;

moving said first and second wafers together so that contact occurs between said opposing mirror-polished surfaces of said first and second wafer.

4,883,216

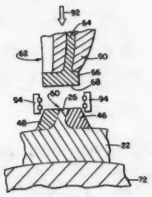
METHOD FOR BONDING AN ARTICLE PROJECTION

Ralph E. Patsfall, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Mar. 28, 1988, Ser. No. 173,791

Int. Cl.[4] B23P *15/02*

U.S. Cl. 228—119 **13 Claims**



1. In a method of repairing an article having a support and an integral projection extending from the support, the steps of:

removing a portion of the projection to provide a projection stub connected to and extending away from the support, the stub having a stub registry surface;

providing a collar having a collar contact surface matched in shape with the stub registry surface and having a collar upper portion;

disposing the stub registry surface and the collar contact surface in juxtaposition with the collar upper portion remote from the support;

bonding together the collar contact surface and the stub registry surface to provide a stub-collar combination, the collar upper portion thereby, defining a first bonding interface;

providing a replacement member including a replacement projection and including at one end a second bonding interface remote from the replacement projection;

disposing the first and second bonding interfaces in juxtaposition; and then

bonding together the replacement member and the stub-collar combination at the first and second bonding interfaces.

4,883,217

METHOD OF BONDING A CERAMIC ARTICLE TO A METAL ARTICLE

Edmund M. Dunn, Lexington; Shinhoo Kang, Wayland, and George C. Wei, Weston, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 17, 1989, Ser. No. 324,928

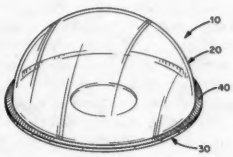
Int. Cl.[4] B23K *31/02*

U.S. Cl. 228—122 **11 Claims**

1. A method of bonding a ceramic article to a metal article to form a ceramic-metal article comprising the following steps:

Step 1. placing a sheet of a brazing material between a surface of a ceramic article and a surface of a metal article forming a layered structure, said ceramic article comprising an yttria based ceramic, said ceramic article having a liquidus temperature, a solidus temperature and a coefficient of thermal expansion, said metal article having a liquidus temperature, a solidus temperature and a coefficient of thermal expansion said sheet of brazing material being in contact with said surface of said ceramic article and in contact with said surface of said metal article, said sheet of brazing material comprising a ductile material containing a group IVB metal, said brazing material having a liquidus temperature less than said solidus temperature of said ceramic article and less than said solidus temperature of said metal article, said brazing material having a solidus temperature above a service temperature of said ceramic-metal article;

Step 2. heating said layered structure from Step 1 in an atmosphere non-reactive to said ceramic article, said



metal article, and said brazing material at a rate of temperature increase sufficiently slow to preclude thermal-shock fracturing said ceramic article and to a temperature above said solidus temperature of said brazing material. less than said solidus temperature of said ceramic article and less than said solidus temperature of said metal article for a period of time sufficient to chemically react said brazing material with said ceramic article and to react said brazing material with said metal article to form a heated layered structure; and

Step 3. cooling said heated layered structure to room temperature at a rate of temperature decrease sufficiently slow to preclude thermal-shock fracturing said ceramic article to form a bonded ceramic-metal article.

4,883,218

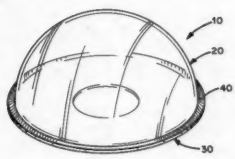
METHOD OF BRAZING A CERAMIC ARTICLE TO A METAL ARTICLE

Edmund M. Dunn, Lexington; Shinhoo Kang, Wayland, and George C. Wei, Weston, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Mar. 17, 1989, Ser. No. 324,856

Int. Cl.[4] B23K *31/02*

U.S. Cl. 228—122 **11 Claims**



1. A method of brazing a ceramic article to a metal article to form a ceramic-metal article comprising the following steps:

Step 1. coating a predetermined surface of a ceramic article with a group IVB metal to form a coated surface of said ceramic article.

Step 2. placing a sheet of a brazing material between said coated surface of said ceramic article and a surface of a metal article forming a layered structure, said ceramic article comprising an yttria based ceramic, said ceramic article having a liquidus temperature, a solidus temperature, and a coefficient of thermal expansion, said metal

article having a liquidus temperature, a solidus temperature, and a coefficient of thermal expansion, said sheet of brazing material being in contact with said coated surface of said ceramic article and in contact with said surface of said metal article, said sheet of brazing material comprising a ductile metal, said brazing material having a solidus temperature and said brazing material having a liquidus temperature less than said solidus temperature of said ceramic article and less than said solidus temperature of said metal article, said brazing material having a solidus temperature above a service temperature of said ceramic-metal article;

Step 3. heating said layered structure from Step 1 in an atmosphere non-reactive to said ceramic article, said metal article, and said brazing material at a rate of temperature increase sufficiently slow to preclude thermal-shock fracturing said ceramic article and to a temperature above said solidus temperature of said brazing material less than said solidus temperature of said ceramic article, and less than said solidus temperature of said metal article for a period of time sufficient to chemically react said brazing material with said ceramic article and to react said brazing material with said metal article to form a heated layered structure; and

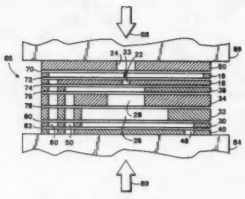
Step 4. cooling said heated layered structure to room temperature at a rate of temperature decrease sufficiently slow to preclude thermal-shock fracturing said ceramic article to form a bonded ceramic-metal article.

4,883,219

MANUFACTURE OF INK JET PRINT HEADS BY DIFFUSION BONDING AND BRAZING

Jeffrey J. Anderson, 12540 SW. Edgewood, Portland, Oreg. 97225; John S. Moore, 15087 NW. Oakmont Loop, Beaverton, Oreg. 97005; Ted E. Deur, 1670 Saltzman Rd., Portland, Oreg. 19077, and Joy Roy, 14855 NW. Hunters Dr., Beaverton, Oreg. 97006

Filed Sep. 1, 1988, Ser. No. 239,358
Int. Cl.[4] B23K *20/00*
U.S. Cl. 228—190 **34 Claims**



1. A method of bonding a first surface of a first metal component of an ink jet print head to a second surface of a second metal component of an ink jet print head, the first and second surfaces being of materials having the same or similar coefficients of thermal expansion, the method comprising:

placing a layer of a filler material on at least one of the surfaces, the filler material having a melting point which is below the melting points of the first and second components, the total thickness of the filler material on the first and second surfaces together being in the range of from approximately one-sixteenth micron to approximately five microns;

positioning the first surface and second surfaces together in an abutting relationship;

applying pressure and heat to the first and second components to diffusion bond the first and second surfaces together without melting the filler material; and

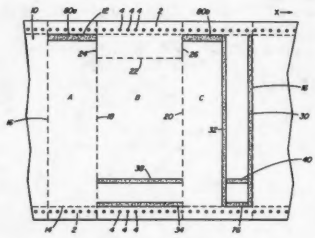
melting the filler material without melting the first and second components to thereby braze the first and second components together.

4,883,220

CONTINUOUS PARTIALLY PREPRINTED WEB FOR HEAT SEALED ENVELOPE CONSTRUCTION

Peter E. Brown, Everett, Canada, assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Dec. 16, 1988, Ser. No. 285,275
Claims priority, application Canada, Aug. 29, 1988, 575955
Int. Cl.[4] B65D *27/10*
U.S. Cl. 229—69 **6 Claims**



1. A continuous partially preprinted, preglued form suitable for subsequent envelope construction comprising:

(a) a single web partially preprinted on one side, having detachable marginal feed hole strips parallel with each longitudinal edge;

(b) transverse marginal lines of perforations defining each individual envelope form with two transverse lines of perforations defining fold lines intermediate said marginal lines of perforations,

(c) on the side of said web opposite said preprinting, a first transverse adhesive strip immediately adjacent one of said transverse marginal lines of perforations,

(d) a second transverse adhesive strip parallel to said first transverse adhesive strip intermediate between said first transverse adhesive strip and the adjacent fold line of perforations,

(e) two first aligned longitudinal adhesive strips parallel to one of said longitudinal edges adjacent a marginal feed hole strip wherein one adhesive strip extends between said transverse adhesive strips and the other extends between said transverse fold lines of perforations,

(f) two second aligned longitudinal adhesive strips parallel to and coextensive with said first two longitudinal adhesive strips and spaced a predetermined distance therefrom, and

(g) a longitudinal line of perforations between said two transverse fold lines of perforations a predetermined distance from the other of said longitudinal edges.

4,883,221

CARTON TRAY APPARATUS

David J. Brundage, Salinas, Calif., assignor to Stone Container Corporation, Chicago, Ill.

Filed Apr. 28, 1989, Ser. No. 344,918
Int. Cl.[4] B65D *5/22*
U.S. Cl. 229—143 **16 Claims**

1. An articulable carton tray apparatus for containment and protection of articles, such as food produce articles, which apparatus resists collapse during stacking while maintaining its assembled configuration under load, said carton tray apparatus comprising:

a bottom wall having oppositely arranged first and second side edges and oppositely arranged first and second end edges, said first and second side edges extending substantially perpendicular to said first and second end edges,

said bottom wall further defining a plurality of corner regions;

first and second side walls extending along and emanating upwardly from said first second side edges respectively;

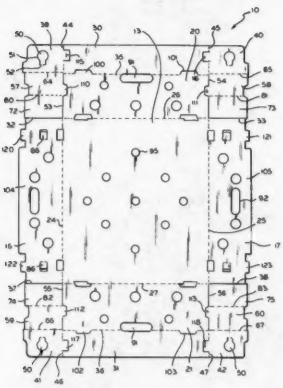
first and second end walls extending along and emanating upwardly from said first and second end edges, respectively;

first and second top walls extending along and emanating from said first and second end walls, respectively;

said bottom wall, said first and second side walls, and said first and second end walls, upon articulation of same, describing an article containment region;

said first and second top walls, extending, upon articulation, substantially parallel to said bottom wall to partially cover said article containment region;

flap means operably emanating from at least one of said first and second side walls, said first and second end walls, and said first and second top walls, for operable alignment



with an adjacent respective one of said first and second side walls, said first and second end walls, and said first and second top walls,

said flap means including a peripheral portion and an internal portion;

first locking means for maintaining said articulation of said bottom wall, said first and second side walls, said first and second end walls, and said first and second top walls,

said first locking means including at least one first locking member positioned within and operably emanating from said internal portion of said flap means for operable positive engagement with said adjacent respective one of said first and second side walls, said first and second end walls, and said first and second top walls; and

support column means, operably positioned, upon articulation, in a support position between at least one of said first and second top walls, and said bottom wall, for resisting collapse of said carton apparatus during stacking.

4,883,222

OPENING STRUCTURE FOR PAPER BEVERAGE CONTAINERS

Satoko Fujisawa, Aptartment 401, 3-6-2 Tobakan, Meguro-ku, Tokyo, Japan

Filed Mar. 1, 1989, Ser. No. 317,550

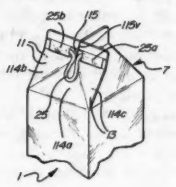
Claims priority, application Japan, Apr. 4, 1988, 63-44799

Int. Cl.[4] B65D *5/74*

U.S. Cl. 229—160.2 **2 Claims**

1. A beverage container formed of resin or wax coated cardboard or paper, having a reclosable dispensing spout for dispensing beverage therefrom, and comprising, in combination:

(a) a rectangular, parallel body portion having a gable top (**7**) with a lateral rib across the top thereof, said gable top having endwalls (**14***a*) and sidewalls (**10***a* and **10***b*), one of said endwalls (**14***a*) of said gable top being adapted for initial sealing said spout at a seal therein and subsequent opening and reclosing said spout, said one end wall (**14***a*) having a pair of folded portions (**114***b* and **114***c*) and a



triangular port at a horizontal edge line (**115***h*), with a leading edge (**15**) defining a free e above said horizontal edge line (**115***h*); and

(b) paper vertical tab tensile force means (**23**) adherent to an external of the leading edge (**15**) of the reclosable dispensing spout at the said lead and extending horizontally outwardly from said leading edge (**15**) said tensile means (**23**) being adapted to be pulled away from the beverage container (**1**) t the leading edge (**15**) from the sidewalls (**10***a* and **10***b*) and open the reclosable dispensing spout.

4,883,223

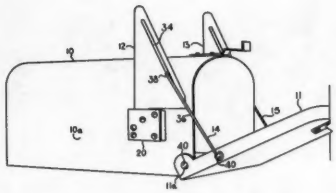
MAILBOX SIGNAL FLAG SYSTEM

George Taniguchi, 5102 Sorrento Dr., Boise, Id. 83704

Filed May 2, 1989, Ser. No. 345,900

Int. Cl.[4] B65D *91/00;* **A47G** *29/12*

U.S. Cl. 232—35 **3 Claims**



1. A mail delivered flag system for attachment to a mail box having a front, downwardly opening, door, and vertical side portions, which comprises:

a mail delivered flag having an elongated flag portion for positioning in a horizontal position, a fully extended vertical position and a dropped vertical position, said flag further having an expansion slot disposed therein for generally vertical orientation when said flag is vertically oriented and generally horizontal orientation when said flag is in a down position;

an elongated channel bar aligned with and attached to the bottom of said flag, said channel bar having an elongated drop slot disposed therein parallel to the longitudinal axis of said channel bar for slidable engagement with a base pivot pin, said channel bar further adapted in size and shape for pivotal rotation about a base pivot pin from said down flag position to a fully extended vertical flag position and for slidable insertion into a channel from said

fully extended vertical flag position to a dropped vertical flag position;

a channel frame assembly having a forward brace and a rear brace, for attachment to a vertical side portion of the mailbox and defining a vertical channel for slidably receiving said channel bar, with said forward brace being of substantially the same length as the defined channel, and said rear brace of a shorter length so as to allow rotation of said channel bar about a base pivot pin from a down flag position to a fully extended vertical position;

a base pivot pin positioned and attached to said channel frame assembly for slidable engagement within the channel bar drop slot to allow the channel bar to rotate from the down flag position to the fully extended vertical position and to drop from said fully extended position to the dropped vertical position;

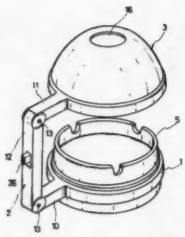
a control arm having one end slidably engaged within the elongated expansion slot of the flag, and the other end pivotally attached to the mailbox door, said control arm sized to engage the bottom end of the expansion slot when the mailbox door is opened to rotate the channel bar about the base pivot pin from the down position to the fully extended vertical position, and when the channel bar is in the dropped vertical position, to slide within the expansion slot, when the mailbox door is reshut, without contacting the top of the expansion slot.

4,883,224

ASHTRAY APPARATUS

Shin-Ching Sun, 3F., No. 32, 132nd Lane, Hu-Lin St., Taipei, Taiwan

Filed May 18, 1988, Ser. No. 197,134
Int. Cl.[4] A42F *19/00*
U.S. Cl. 232—43.1 **7 Claims**



1. An ashtray apparatus comprising:

a seat having an upper surface adapted to receive an ashtray and defining a hollow space adapted to receive a PC board and at least one battery;

a cage cover adjustably connected to said seat and having an open end opened towards said seat;

a negative ion emitting needle device fixed at the open end of said cage cover and having one end connected to a negative ion output circuit of the PC board;

a positive ion dust collecting film fixed with said cage cover; and

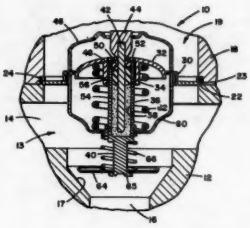
wherein particle cigarette ashes from smoke produced from a burning cigarette in the ashtray adheres to said positive ion dust collecting film responsive to operation of said negative ion emitting needle device.

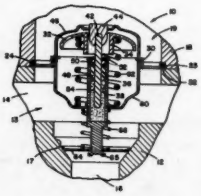
4,883,225

FAIL-SAFE THERMOSTAT FOR VEHICULAR COOLING SYSTEMS

James L. Kitchens, Haiku, Hi., assignor to S.T.C., Inc., Haiku, Hi.

Filed Mar. 18, 1988, Ser. No. 170,405
Int. Cl.[4] F01P *7/02*
U.S. Cl. 236—34.5 **16 Claims**





6. A vehicular thermostat for controlling flow of coolant in a passageway between a coolant pump and a radiator comprising:

cylindrical means defining a central interior chamber having an open end;

central rod means extending into the interior chamber through the open end and having a free end adjacent the passageway;

seal means within the cylindrical means slidably engaged to the central rod means and closing the open end of the interior chamber;

a temperature responsive medium filling the interior chamber, said medium volumetrically changing with temperature to act against the central rod means and exert force on the cylinder means to displace the same axially in a first direction;

valve means coupled to the cylindrical means and movable therewith, the coupling including a temperature responsive alloy material;

thermostat housing means mountable in fixed relation to the passageway and coupled to the free end of the central rod to hold the central rod in fixed relation; and

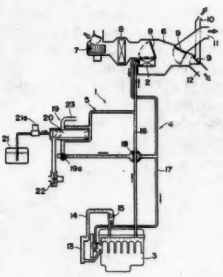
means including a spring means disposed between the valve means and the thermostat housing means for (1) opposing movement of the valve means in the first direction and (2) shifting the position of the valve means if the coolant exceeds a predetermined temperature and melts the temperature responsive alloy material.

4,883,226

HEATER DEVICE FOR MOTOR VEHICLE

Itizo Tomita, Konan, and Takehide Matsumoto, Higashi-matsuyama, both of Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Aug. 2, 1988, Ser. No. 227,252
Claims priority, application Japan, Aug. 12, 1987, 62-201391
Int. Cl.[4] B60H *1/02*
U.S. Cl. 237—12.3 C 3 Claims



1. A heater device for a motor vehicle having an engine wherein cooling water is used for heating the passenger compartment of the motor vehicle, said heater device comprising:

a heater core for exchanging heat between the engine cooling water and air going to the passenger compartment of the motor vehicle;

a circulation circuit for circulating the engine cooling water between the engine and said heater core, said circulation circuit having a supply conduit adapted to be connected to the engine for supplying therethrough the engine cooling water from the engine to said heater core and a return conduit adapted to be connected to the engine for returning therethrough the engine cooling water from said heater core to the engine;

a combustion heater for heating the engine cooling water;

a bypass circuit branching off from said supply conduit for bypassing the engine cooling water to said combustion heater, said bypass circuit having a supply pipe for supplying the engine cooling water from said supply conduit to said combustion heater for heating the engine cooling water and a return pipe for returning the engine cooling water heated by said combustion heater to said supply conduit; and

a directional control valve for changing the flow path of the engine cooling water, said directional control valve comprising a valve box and rotary valve spool disposed in said valve box;

said valve box having a first intake port connected to a first portion of said supply conduit extending from the engine to said valve box, a first discharge port connected to a second portion of said supply conduit extending from said valve box to said heater core, said first discharge port disposed diametrically opposite and in confronting relation to said first intake port, a second intake port connected to said return conduit, and a second discharge port connected to said supply pipe, said second discharge port disposed diametrically opposite and in confronting relation to said second intake port;

said intake and discharge ports in said valve box equally circumferentially spaced about said valve box with respect to each other; and

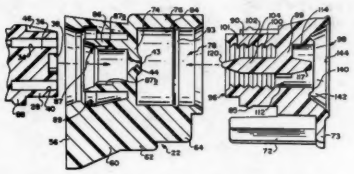
said rotary valve spool having a radial straight hole extending therethrough passing through the central axis of said rotary valve spool for interconnecting said diametrically opposite intake and discharge ports and an arcuate peripheral recess extending over one-fourth of the entire circumference of said rotary valve spool for connecting two adjacent said ports.

4,883,227

FOAMER NOZZLE ASSEMBLY WITH AIR PASSAGEWAY

Joseph W. J. Maas, Someren, Netherlands, assignor to AFA Products, Inc., Forest City, N.C.

Continuation of Ser. No. 817,935, Jan. 10, 1986, Pat. No. 4,730,775. This application Feb. 19, 1988, Ser. No. 158,329
The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.
Int. Cl.[4] B05B *1/02, 1/12, 7/04*
U.S. Cl. 239—120 9 Claims



2. A trigger sprayer having a mounting formation at a front end thereof from which liquid is ejected and comprising a foam generating nozzle assembly including structure having an orifice and a foam generating chamber therein, said nozzle assembly structure being mounted on the formation at the front end of said trigger sprayer so that liquid is emitted from the formation at the front end of the trigger sprayer through said orifice into said foam generating chamber in a generally conical spray pattern, said foam generating chamber having an entrance end into which said spray is directed, and said nozzle assembly also including a front nozzle member having a discharge opening at a front end thereof from which foam is discharged, said discharge opening being in communication with said foam generating chamber whereby foam is ejected forwardly from said foam generating chamber into and then out of said discharge opening, air passage means for supplying air to the entrance end of said foam generating chamber, and having an enclosed air passageway having a first end and a second end, said first end communicating with said air passage means and said second end opening adjacent said front end of said front nozzle member and adjacent said discharge opening at said front end of said front nozzle member.

4,883,228

WATER-STABILIZED SPRINKLER

William J. Vydrzal, and William S. Vydrzal, both of 1409 E. 8th St., Smithville, Tex. 78957

Filed Sep. 12, 1988, Ser. No. 242,867
Int. Cl.[4] B05B *15/00*
U.S. Cl. 239—279 1 Claim

1. A garden sprinkler comprising a ground-engageable hollow base having an H-configuration in top plan view, an elongated riser conduit (49) extending upwardly from a central point on said base, and a sprinkler head (51) mounted on the upper end of said conduit;

said hollow base comprising a central hub member (39) having first, second, third and fourth socket openings therein; said first, second and third socket openings being oriented in a horizontal T-configuration, with said first and second socket openings being in horizontal axial alignment with one another, and with said third socket opening being normal to the first and second socket openings; said fourth socket opening extending vertically upwardly from a central point on the hub member;

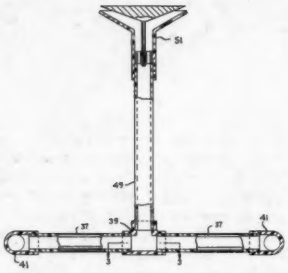
an internally threaded water intake fitting (47) extending into said third socket opening, said intake fitting being adapted to connect with a water supply hose for introduc-

ing pressurized water into the central hub member and associated socket openings;

a first straight horizontal pipe (37) having one end thereof extending into said first socket opening; a second straight horizontal pipe (37) having one end thereof extending into said second socket opening, whereby said first and second pipes are in axial alignment with each other;

a first T-fitting (41) connected to the other end of said first pipe; third and fourth horizontal pipes (43 and 45) having ends thereof connected to said first T-fitting so that said third and fourth pipes are in axial alignment with each other and normal to said first pipe;

a second T-fitting (41) connected to the other end of said second pipe; fifth and sixth horizontal pipes having ends thereof connected to said second T-fitting so that said fifth and sixth pipes are in axial alignment with each other and normal to said second pipe;



sealing caps on the free ends of said third, fourth, fifth and sixth pipes;

said first, second, third, fourth, fifth and sixth pipes being in liquid communication with each other and with said central hub member, so that the weight of the hollow base is augmented by the weight of the water contained in said pipes, to thus provide increased resistance against overturnment of the sprinkler;

the aforementioned riser conduit having its lower end seated in said fourth socket opening so that pressurized water flows from the central hub member into the riser conduit and thence into the aforementioned sprinkler head;

said first and second horizontal pipes having the same length;

said third, fourth, fifth and sixth pipes baving the same length, whereby the central hub member is located at the imaginary center of the hollow H-configuration base.

4,883,229

RETROFIT REFUELING APPARATUS FOR AN OVERHEAD FUEL MANIFOLD

Arnold T. Moeller, 3565 Dorothy La., South, Fort Worth, Tex. 7610

Continuation of Ser. No. 84,282, Aug. 11, 1987, abandoned. This application Oct. 11, 1988, Ser. No. 258,123

Int. Cl.[4] F17D *1/00*; B65B *3/04*

U.S. Cl. 239—587 **2 Claims**

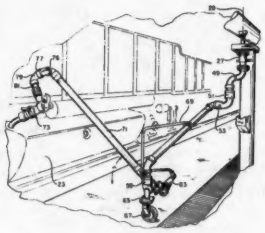
1. A locomotive refueling apparatus, comprising:

an overhead fuel manifold of the type used to supply fuel to a locomotive fuel tank, the overhead fuel manifold being supported in a horizontal orientation above the ground and having a primary flow valve which extends downwardly from the overhead fuel manifold along a vertical axis with respect to the ground;

a feed pipe of rigid material connected at one end to the primary flow valve by a vertical swivel joint which allows rotation in an arc about the vertical axis defined by the primary flow valve, the feed pipe having an opposite end;

a movable carriage mounted on a wheel, the carriage being connected to the opposite end of the feed pipe whereby the carriage s movable on the wheel in an arcuate path which defines a fixed orbit with respect to the vertical axis of the primary flow valve, the feed pipe forming an inclined angle greater than horizontal with respect to the ground between the movable carriage and the primary flow valve;

a refueling arm of rigid material running from the movable carriage to a refueling nozzle and communicating with the feed pipe for conveying fuel from the primary flow valve to the refueling nozzle, the refueling arm being joined to the movable carriage by an elbow coupling which includes a vertical swivel joint which allows the refueling arm to be rotated in an arc about an imaginary vertical axis defined by the wheel between a rest position and a loading position and which also includes a horizontal swivel joint;



a torsion spring means mounted on the movable carriage between the refueling arm and the carriage for spring biasing means such that the refueling arm is biased to a positive angular orientation above the plane of the ground, whereby the refueling arm is movable about the horizontal swivel joint of the movable carriage through a range of positive angular orientations and whereby the refueling arm and the feed pipe form a V-shaped configuration in both the loading position and the rest position; and

wherein the movable carriage the sole point of contact with the ground between the primary flow valve and the refueling nozzle wherein the feed pipe and refueling arm together define a predetermined length of pipe between the primary flow valve at one end and the refueling nozzle at an opposite end, the movable carriage being located at the approximate midpoint of the predetermined length.

4,883,230

CABLE SWITCHING DEVICE

Lennart Lindström, Vällingby, Sweden, assignor to Kabmatik AB, Vällingby, Sweden

Filed Jun. 7, 1988, Ser. No. 203,112

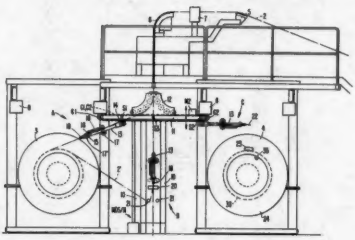
Claims priority, application Sweden, Jun. 12, 1987, 8702454

Int. Cl.[4] B65H *54/00*

U.S. Cl. 242—25 R **10 Claims**

1. In a system for winding a partly flexible elongate body (2), such as a cable, selectively on one of a first rotatable take-up drum (3) and a second rotatable take-up drum (4), a switching device for switching the elongate body from one of said drums to the other for take-up, said switching device comprising a pivotable guide arm (13) for supporting the elongate body (2) and adapted to be directed to the first (3) or, alternatively, the second (4) drum, as selected, or to a cutting device (20), said guide arm (13) comprising a nose portion (18) movable into and out of the selected drum (4 or 3), a clamping member (15, 16, 19) in the guide arm (13) for temporary clamping of said elongate body (2), said cutting device (20) being adapted to cut

the elongate body at a given distance from the guide arm nose portion (18), and a catch arm (25) adapted to be inserted into the selected drum (4 or 3) through a suitable opening (23) in one of the sides (24) of the selected drum so as to take the cut-off free end (22) of the elongate body from the nose portion



(18) inside the selected drum (4 or 3), and transfer it to a grapple (32) outside the selected drum (4 or 3), said grapple (32) being adapted to hold the free end (22) and rotate together with the selected drum (4 or 3) during the subsequent winding of the elongate body (2) onto the selected drum.

4,883,231

COP TUBE TRANSPORTING DEVICE FOR TEXTILE MACHINES

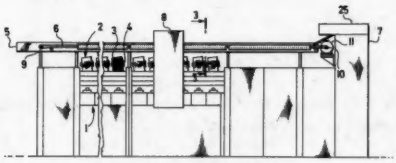
Frantisek Burysek, Usti nad Orlici; Bohuslav Jirka, Upice; Zdenek Jarolimek, Bila Tremesnice, and Ludvik Fajt, Usti nad Orlicii, all of Czechoslovakia, assignors to Vyzkumny ustav bavlnarsky, Usti nad Orlici, Czechoslovakia

Filed Aug. 30, 1988, Ser. No. 238,692

Claims priority, application Czechoslovakia, Sep. 2, 1987, 6374-87

Int. Cl.[4] B65H *67/04, 67/06*

U.S. Cl. 242—35.5 A **12 Claims**



1. A cop tube transporting device for a textile machine for guiding tubes from a magazine at one end of the machine to tube withdrawing means of a travelling automatic service unit, said device comprising

a conveyor arranged along the machine, and a guiding support surface;

the conveyor comprising an endless flat conveyor belt, said conveyor belt being supported by an upper slide surface of an upper supporting wall, said supporting wall being mounted to said machine;

said supporting wall together with said conveyor belt being inclined to a horizontal plane at an angle of at least 10 degrees, and at most 45 degrees.

4,883,232

ADHESIVE TAPE FEEDER, PARTICULARLY FOR A CARDBOARD BOX SEALING MACHINE TAPING UNIT

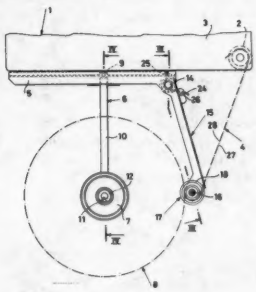
Augusto Marchetti, Piazza Sicilia, 7, 20146 Milano, Italy

Continuation of Ser. No. 765,157, Aug. 13, 1985, abandoned. This application Sep. 2, 1987, Ser. No. 93,144

Claims priority, application Italy, Oct. 17, 1984, 23545/84[U]

Int. Cl.[4] B65H *19/04*

U.S. Cl. 242—55.2 **2 Claims**



1. An adhesive tape feeder, particularly for a cardboard box-sealing machine taping unit, comprising:

a longitudinally-elongated support frame;

a supporting arm means having two opposite ends, said supporting arm means depending by one said end from a first site on said support frame;

a freely-revolvable roller arranged with a longitudinal axis of revolution thereof crosswise to said longitudinally-elongated support frame;

said support arm means supporting said roller at an opposite said end of said support arm means;

a roll of adhesive tape having an outer circumferential peripheral surface and a generally constant width extending longitudinally of said roll of adhesive tape;

said roll of adhesive tape being mounted on said roller for revolution therewith;

a lever having two opposite ends, said lever depending by one said end from a second site on said support frame, said second site being longitudinally spaced along said support frame from said first site;

a tape withdrawal roller arranged with a longitudinal axis of revolution thereof crosswise to said longitudinally-elongated support frame, said tape withdrawal roller including an axially central drum portion having a radially outwardly-facing circumferential peripheral surface flanked at axially opposite ends by respective circumferentially-extending flanges each having a greater radially outward extent than said radially outwardly-facing circumferential peripheral surface, said flanges being spaced axially apart along said tape withdrawal roller by a certain distance;

said tape withdrawal roller being disposed with said radially outwardly-facing circumferential peripheral surface thereof in facial contact throughout a substantial angle of circumferential extent thereof, with an outer face of a leading portion of adhesive tape as withdrawn tangentially from said roll of adhesive tape, with opposite ends of said leading portion being flanked by said flanges of said tape withdrawal roller;

spring means active between said support frame and said lever for resiliently biasing said radially outwardly-facing circumferential peripheral surface of said drum portion thereof against said outer circumferential peripheral surface of said roll of adhesive tape at a leading end withdrawal site;

stop element means provided and effective between said support arm means and said freely-revolvable roller for

permitting a range of limited axial movement of said freely-revolvable roller along said longitudinal axis thereof, transversally of said support frame;

the difference between the length of said certain distance by which said flanges of said tape withdrawal roller are spaced apart and said constant width of said roll of adhesive tape being less than the maximum limited axial movement of said freely-revolvable roller permitted by said stop element means; and

a braking means provided and effective between said tape withdrawal roller an said lever for braking revolution of said tape withdrawal roller.

4,883,233

METHOD FOR CONTROLLING THE REELING OF A WEB

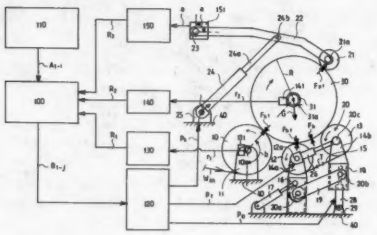
Seppo Saukkonen, Vantaa, and Kauko Tomma, Helsinki, both of Finland, assignors to Valmet Paper Machinery, Inc., Finland

Filed May 20, 1988, Ser. No. 196,740

Claims priority, application Finland, May 20, 1987, 872224

Int. Cl.[4] B65H *18/20*

U.S. Cl. 242—66 **16 Claims**



1. Method for controlling reeling of a web, comprising the steps of

measuring the radius of a roll that is being formed by said reeling, with at least one detector,

passing measurement signals from the at least one detector to a reeling control system,

storing predetermined values in a memory of the control system and comparing said measurement signals with said stored values, and thereby forming adjusting signals in the control system,

adjusting support of the roll being formed with said generated adjustment signals,

supporting the roll being formed from underneath with a carrier roll and passing incoming web over a sector of the carrier roll,

stabilizing the roll being formed in reeling position with a press member placed at an upper side of the roll being formed,

supporting the roll being formed with a belt at least when the reeled-up roll passes a certain radius in size,

wherein the roll support is adjusted by at least adjusting tension of the supporting belt, which in turn adjusts linear load of the belt support,

wherein said supporting belt is adjusted so that with larger radii of the roll being formed, a supporting sector provided by the belt along an outer circumference of the roll being formed is several times longer as compared to a supporting sector formed by a supporting roll nip, and

programming and controlling said adjusting step to provide a substantially suitable distribution of linear load in a nip formed by the carrier roll and the web roll being formed as a function of radius of the web roll, and to maintain other supporting linear loads within predetermined limits permitting a substantially undisturbed reeling and good quality of the reeled roll.

4,883,234

CASSETTE WITH WINDING SLACK PREVENTING MECHANISM

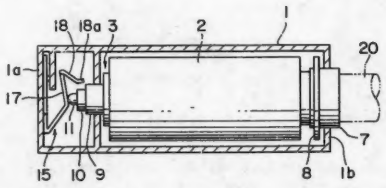
Noboru Yamakawa, Nara, and Mineo Yamauchi, Kyoto, both of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Japan

Filed Oct. 19, 1988, Ser. No. 259,593

Claims priority, application Japan, Oct. 19, 1987, 62-158795[U]

Int. Cl.[4] B65H *18/10*

U.S. Cl. 242—67.3 R **5 Claims**



1. In a cassette of the type in which reels carrying a sheet-like medium wound there around are rotatably mounted in a cassette case in such a manner that the reels are movable in their longitudinal directions, said cassette having winding slack preventing mechanism, the improvement of said mechanism comprising:

rotation preventing means extending axially outwardly of one end of at least one of the reels;

a projection on said rotation preventing means, extending axially outwardly;

said rotation preventing means and said projection being disposed within a space defined in said cassette case; and

a reel-biasing leaf-spring assembly provided in said space to bias the reel longitudinally thereof in a direction opposite to the direction in which said projection projects, said leaf-spring assembly being in contact with said projection for biasing the reel and having on the distal end thereof a rotation preventing arm disposed adjacent to, and normally engaging said rotation preventing means to prevent the rotation of the reel,

said leaf-spring assembly being so designed and constructed that when the reel is pushed in the direction opposite to the direction in which said leaf-spring assembly imparts the biasing force so that said leaf-spring assembly is deformed, said rotation preventing arm is moved away from said rotation preventing means, thereby to allow the reel to rotate.

4,883,235

FILM CASSETTE

John J. Niedospial, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 8, 1989, Ser. No. 320,440

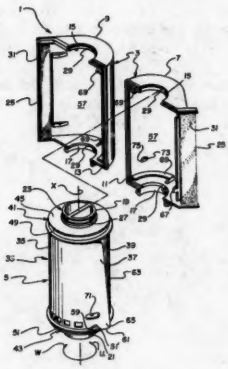
Int. Cl.[4] G03B *17/26*

U.S. Cl. 242—71.1 **8 Claims**

1. An improved film cassette wherein (a) a film spool is rotatable within the cassette shell, (b) a convoluted film roll whose outermost convolution is a film leader is coiled about said spool, (c) a pair of flanges are coaxially arranged on said spool to radially confine said film leader to prevent the leader from substantially contacting an interior wall of said cassette shell, and (d) a film stripper-guide is received between a leading end of said film leader and the next-inward convolution of said film roll succeeding the leader to remove said leader from said flanges and guide the leader through a film passageway to the exterior of said cassette shell responsive to rotation of said spool in a film unwinding direction, and wherein the improvement comprises:

said film leader and at least one of said flanges include mu-

tual engagement means for maintaining said leading end of the leader spaced at least a minimum radial distance from said next-inward convolution sufficient to locate the leading end within range of said stripper-guide to ensure that



said leading end will be advanced over the stripper-guide responsive to rotation of said spool in the film unwinding direction, whereby said leading end is prevented from being advanced between said stripper-guide and said next-inward convolution.

4,883,236

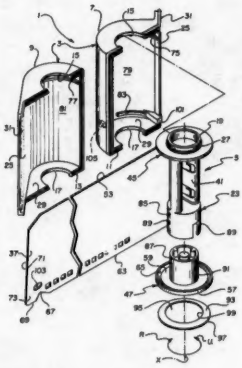
FILM CASSETTE

John J. Niedospial, Jr., Rochester, and Patricia D. Fairman, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 8, 1989, Ser. No. 320,438

Int. Cl.[4] G03B *17/26*

U.S. Cl. 242—71.1 **6 Claims**



1. An improved film cassette wherein (a) a spool includes two coaxial core pieces having a convoluted film roll coiled about them, whose outermost convolution is a film leader, and respective flanges fixed to said core pieces which radially extend over the opposite sides of said film roll, (b) at least one of said core pieces is supported for movement axially toward the other one to move at least one of said flanges axially toward the other one to provide an axial clamping force at the opposite sides of said film roll, and (c) a film stripper-guide is received between a leading end of said film leader and the next-inward convolution of said film roll succeeding the leader to remove said leader from said flanges and guide it through a film passageway to the exterior of the cassette shell responsive to rotation of said spool in the film unwinding direction during application of said axial clamping force, and wherein the improvement comprises:

said film leader and at least one of said flanges are adapted for mutual engagement to secure said leading end of the leader at least a minimum radial distance from said next-inward convolution sufficient to locate the leading end within range of said stripper-guide to ensure that said leading end will be advanced over the stripper-guide responsive to rotation of said spool in the film unwinding direction during application of said axial clamping force; and

limiting means for restricting axial separation between said flanges, previous to at least one of the flanges being moved axially toward the other one, to maintain the leader and at least one of said flanges mutually engaged to secure said leading end of the leader said minimum radial distance from said next-inward convolution.

4,883,237

WIRE REEL

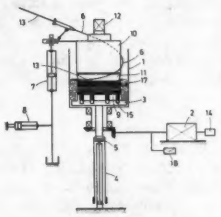
Gerhard Berz, Leverkusen, Fed. Rep. of Germany, assignor to Sms Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Aug. 22, 1988, Ser. No. 235,033

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727741

Int. Cl.[4] B21C *47/00*

U.S. Cl. 242—83 **7 Claims**



1. A reel for wire with a wire basket, comprising a reel bottom which can be raised and lowered and a spiral tube cylinder which can be raised and lowered and swiveled relative to the reel bottom, the spiral tube cylinder having a diameter and a lower end, a spiral tube connected to the spiral tube cylinder, the reel bottom having a series of axial projections facing the lower end, the axial projections defining a circumference having a diameter, wherein the diameter of the circumference corresponds to an inner diameter of the wire coil to be coiled, and wherein the diameter of the cylinder also corresponds to the inner diameter of the coil to be coiled.

4,883,238

FLY FISHING REEL WITH A LINE RETAINER

John R. Harder, East Dorset, Vt., assignor to The Orvis Company, Inc., Manchester, Vt.

Filed Dec. 23, 1988, Ser. No. 289,306

Int. Cl.[4] A01K *89/01*

U.S. Cl. 242—317 **14 Claims**

1. In a fly fishing reel comprising:

a frame having a mounting means for attaching said frame to a fly rod and a spindle;

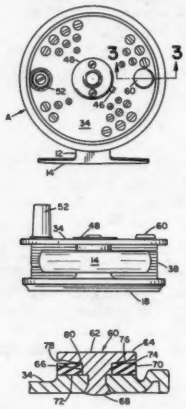
a spool having an axis, said spool comprising a first side wall

having a periphery, a second side wall having a periphery and a hub adapted to rotate about said spindle;

a handle having a fixed mass located on one of said side walls;

the improvement comprising;

a line retainer located on the said one of said side walls at a position diametrically opposed to said handle, said line retainer having a fixed mass related to the mass of said



handle in approximately inverse proportionality to the relationship between the distance from the spool axis to the line retainer and the distance from the spool axis to the handle to afford balanced rotational movement of the spool; wherein said line retainer comprises a metallic stud having an enlarged head portion secured to said one side wall and having resilient gripping means which, along with said head portion, defines a groove adapted to grip a fishing line below said head portion.

4,883,239

GUIDED ARTILLERY PROJECTILE WITH TRAJECTORY REGULATOR

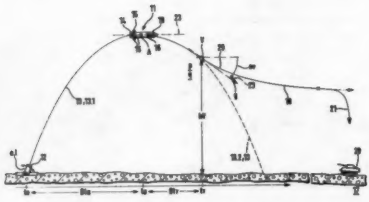
Karl-Heinz Lachmann; Peter Sundermeyer, both of Lauf-Pegn.; Johann Schreier, Ruckersdorf; Albrecht Reindler, Lauf-Schonberg, and Jurgen Leininger, Lauf/Pegn., all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Oct. 21, 1988, Ser. No. 260,882

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738580

Int. Cl.[4] F41G *7/22*

U.S. Cl. 244—3.15 **11 Claims**



1. A guided artillery projectile with an autopilot, a flight attitude regulator in said autopilot for the transitional guidance into a gliding trajectory upon the assumption of a predetermined pitch angle after passage through the apogee of a ballistic firing trajectory; and different mission-dependent parameter inputs being provided for the regulator.

4,883,240

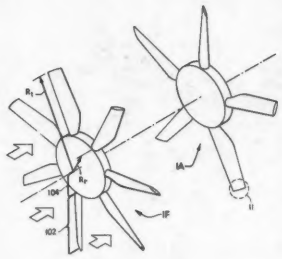
AIRCRAFT PROPELLER NOISE REDUCTION

Arthur P. Adamson, and Philip R. Gliebe, both of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Continuation of Ser. No. 764,144, Aug. 9, 1985, abandoned. This application Nov. 12, 1986, Ser. No. 930,065

Int. Cl.[4] B64C *11/48*

U.S. Cl. 244—69 **23 Claims**



1. A counterrotating aircraft propeller set comprising:

(a) a first propeller having N1 blades and

(b) a second propeller having N2 blades

wherein N1 and N2 are selected from the following group of numbers: 3, 5, 7, 9, 11, 13, 15, and 17 and wherein the difference between N1 and N2 is 2.

4,883,241

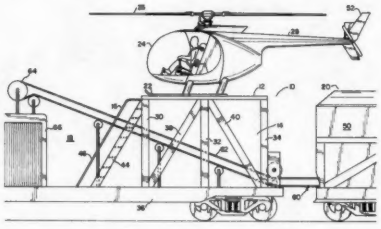
HELICOPTER PAD FOR TRAINS

Edwin DeS. Snead, P.O. Box 1000, Georgetown, Tex. 78626

Filed Sep. 8, 1988, Ser. No. 241,705

Int. Cl.[4] B64F *1/00*

U.S. Cl. 244—114 R **18 Claims**



1. A helicoper pad for use on trains comprising:

a flat surface having an area suitable for the receipt of helicopter skids, said flat surface having a strength suitable for supporting the weight of a helicopter, said flat surface comprising a plurality of sections of plywood material, said flat surface having a plurality of stiffeners extending beneath said sections;

a plurality of structural members connecting said flat surface to the frame of a railroad car; and

ladder means extending from said flat surface and connected to the frame of said railroad car, said ladder means for providing access to said flat surface.

4,883,242

PACKING SACK FOR A LIFE JACKET AND ITS EASY ACCESS STORAGE, ESPECIALLY IN AN AIRCRAFT

Reinhard Becker, and Bruno Jansa, both of Hamburg, Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Bremen, Fed. Rep. of Germany

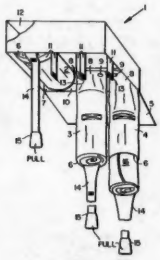
PCT No. PCT/DE87/00052, § 371 Date Dec. 7, 1987, § 102(e) Date Dec. 7, 1987, PCT Pub. No. WO87/04990, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 14, 1987, Ser. No. 123,862

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1986, 3604857

Int. Cl.[4] B64D *13/00*

U.S. Cl. 244—118.5 **13 Claims**



1. A packing sack for a life jacket and for an easy access storage of said life jacket, in a craft, such as an aircraft, comprising a substantially hose shaped construction forming said packing sack with an open end **(6, 32)** and a closed end **(7)**, said closed end **(7)** having a tab **(8, 30)** for receiving at least one securing element, a rip cord **(14, 28)** on the inside of said packing sack, said rip cord being secured to said packing sack, at a location intermediate the ends of said packing sack **(2, 3, 4, 25)**, said rip cord leading from said location around that jacket end of a folded life jacket **(16, 26)** which faces away from said open end **(6, 32)** of said packing sack **(2, 3, 4, 25)**, said rip cord further passing along the inner surface of the packing sack **(2, 3, 4, 25)** out through said open end **(6, 32)**, and wherein said packing sack has such an inner dimension that a life jacket **(16, 26)** is safely held by friction inside said packing sack in a vertical position of said packing sack **(2, 3, 4, 25)** hanging with its open end **(6, 32)** downwardly.

4,883,243

EJECTION SEAT HAVING RECEDING HEADREST FOR SPINAL ALIGNMENT DURING EJECTION

Gerald F. Herndon, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 17, 1987, Ser. No. 121,531

Int. Cl.[4] B64D *25/10*

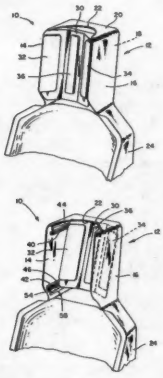
U.S. Cl. 244—122 R **19 Claims**

1. A receding ejection seat headrest comprising:

a rigid shell mounted on said seat in a position that is adapted to be behind the head of a pilot occupying said seat, said shell having a back panel and a pair of side panels extending forwardly from said back panel, said side panels being spaced apart by a distance that is slightly larger than the width of the pilot's helmet;

a front panel extending between the forward edges of said side panels, said front panel being in a position that is adapted to support the pilot's head at a forwardly titled angle at a position that is substantially in front of the forward edges of said side panels; and

actuation means for moving said front panel rearwardly into said shell to allow the pilot's head to move rearwardly between said side panels to an angle at which the pilot's head and spinal column are in alignment with each other



and the pilot's head is substantially enclosed by said side panels.

4,883,244

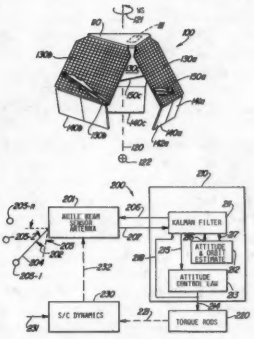
SATELLITE ATTITUDE DETERMINATION AND CONTROL SYSTEM WITH AGILE BEAM SENSING

A. Dorian Challoner, Manhattan Beach; U. A. von der Embse, Westchester; Mark P. Mitchell, Playa del Rey; Donald C. D. Chang, Thousand Oaks; Richard A. Fowell, Palos Verdes Estates; Ken Y. Huang, Redondo Beach; Joseph H. Hayden, Rancho Palos Verdes, and Gene E. Allen, Torrance, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 23, 1987, Ser. No. 137,225

Int. Cl.[4] B64G *1/24, 1/36*

U.S. Cl. 244—171 **25 Claims**



1. An on-board attitude determination system for a spacecraft orbiting a celestial body comprising:

means for estimating the orbit and attitude of the spacecraft relative to a plurality of remote sources of coherent energy signals;

an agile beam sensor sensing the locations of the remote sources;

means for pointing the agile beam sensor at the estimated relative locations of the remote sources;

means for determining error signals representative of the difference between the estimated locations of the remote

sources and actual locations of the remote sources as sensed by the agile beam sensor; and

said estimating means being adapted to receive said error signals and update the predicted orbit and attitude of the spacecraft.

4,883,245

TRANSPORATION SYSTEM AND METHOD OF OPERATION

Thomas F. Erickson, Jr., 213 Engle Dr., Wallingford, Pa. 19086

Filed Jul. 16, 1987, Ser. No. 74,534

Int. Cl.[4] B61L *27/00*

U.S. Cl. 246—2 R **22 Claims**

find x_{ij}'s and y_{ajj}'s so as to

minimize $Z = \sum_{i=1}^{n}\sum_{j=1}^{n} c_{ij}x_{ij}$, for $i \neq j$

subject to $a_{ij}x_{ij} + \sum_{a=1}^{p} y_{aij} - \sum_{a=1}^{q} y_{aji} \geq b_{ij}$, for $i \neq j$

and $x_{ij} = 0, 1, 2 \ldots m$

$y_{aij} = 0, 1, 2 \ldots m$

$y_{aji} = 0, 1, 2 \ldots m$

where a "primary route" is one with no intermediate stops

a "secondary route" is a combination of primary routes

n = number of yards

x_{ij} = no. of trains run on primary route from yard i to yard j

c_{ij} = variable cost of primary route train from yard i to yard j

a_{ij} = max. no. of cars on primary route train from yard i to yard j

b_{ij} = no. of cars to be moved from yard i to yard j

y_{aij} = no. of cars moved from yard i to yard j via one of the secondary routes ik j, p in no., but not via a primary route train from yard i to yard j

y_{aji} = the no. of cars moved from yard i to yard j via one of the secondary routes k_{ji}, q in no., which begins with, or ends with or is embedded with a primary route train from yard i to yard j

p = (n-2)u, where u = the no. of routes for (n-i) yards

q = p(n-i) + (n-2)(i-u)

1. An improved method of operating a freight train system on a predefined network of rail lines wherein freight trains comprise locomotive means, freight cars and operating method comprising:

(a) establishing an array of Nodes throughout said linear network whereat trains arrive and/or depart, defining:

(i) Primary Nodes as Nodes whereat both operating crews and freight cars are interchanged;

(ii) Secondary Nodes as Nodes whereat freight cars are interchanged and operating crews are not; and

(iii) Tertiary Nodes as Nodes whereat operating crews are interchanged and freight cars are not;

(b) defining a plurality of Routes for the freight trains such that:

(i) each Route includes a set of Nodes along a linear path within said network,

(ii) each said set of Nodes comprises at least Nodes at each end of said linear path which are defined as Primary Nodes, and

(iii) all Nodes are included in at least one Route;

(c) selectively configuring trains into Relays for departure from each Primary and Secondary Node including:

(i) grouping freight cars destined for common destination Nodes together in contiguous linear Blocks; and

(ii) selectively determining a maximum number of said Blocks for each Relay such that each Relay departing from a given Node along its given Route comprises only Blocks destined for the maximum Block number of next consecutive Primary and Secondary Nodes whereby freight cars to be delivered to more distant Primary and Secondary Nodes along said Route are transshipped through an intermediate Primary or Secondary Node destination;

(d) selecting a maximum Cue Frequency being the upper limit of selected Cue Frequencies for each Route, Cue Frequency being a uniform time interval between successive Relays on said Routes;

(e) for each said Route, operating at least a number of Relays equal to the number of Primary and Tertiary Nodes contained within the respective Route minus one (P+T−1) such that Relays depart in each direction:

(i) from at least every other Primary and Tertiary Node at the commencement of operation, and

(ii) from every Node exactly once during each Cue Frequency interval thereafter during operation; and

(f) scheduling crews to operate said Relays upon their respective Routes such that crews are scheduled to return to their Node of origin within the maximum Cue Frequency.

4,883,246

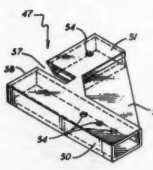
THREE LEGGED WORKBENCH

Joseph R. Esposito, 315 Greenway Ave., Syracuse, N.Y. 13206

Division of Ser. No. 231,829, Aug. 12, 1988. This application Mar. 13, 1989, Ser. No. 321,920

Int. Cl.[4] F15M *11/00*

U.S. Cl. 248—165 **6 Claims**



1. A corner bracket for use in the construction of a three legged support frame for a workbench that includes a pair of perpendicularly aligned hollow arms said arms including a vertically disposed arm that is closed at the top and having a bottom opening for receiving a leg member therein so that the leg stands upright on a support surface and a horizontally disposed arm having a bottom wall and two side walls and an opening in the distal end thereof, for slidably receiving a beam member therein, said horizontal arm further including an angularly disposed notch having an open top, said notch being located behind the opening for slidably receiving said beam member in said horizontally disposed arm, said notch passing downwardly through the top of the bracket for allowing a second horizontally disposed beam member to be inserted downwardly into said opening, said notch being at an angle of 60 degrees with one side wall of the horizontal arm, the depth of said notch being equal to the depth of the horizontal arm, a reinforcing support means positioned immediately beneath the notch for providing load bearing support to a beam inserted in said notch whereby three of said corner brackets can be joined in assembly to form an adjustable triangular work bench frame by placing one end of a beam member in the horizontal arm of each bracket and the other end of each beam member in the notch of another bracket and a leg member in the vertical arm of each bracket.

4,883,247

PICTURE HANGER AND METHOD OF USING

Neil H. Crandall, 309 Watauga Ave., Elizabethton, Tenn. 37643

Filed Jun. 27, 1988, Ser. No. 211,863

Int. Cl.[4] A47F *7/14*

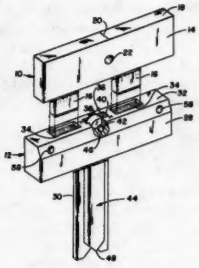
U.S. Cl. 248—542 **11 Claims**

1. A picture hanger comprising

a T-shaped wall mount member having a horizontal portion and a vertical portion extending intermediately of and below said horizontal portion, said horizontal portion having a flat horizontal upper surface; said T-shaped wall mount member being securable on one side thereof to a wall of a room and having on the other side an elongated pendulum member pivotally mounted therefrom for indi-

cating when the T-shaped wall mount member has been oriented on said wall to align said horizontal portion in a plane parallel to normal horizontal reference lines about said room, said T-shaped wall mount member defining within said flat horizontal upper surface two spaced similarly shaped apertures extending downwardly into said horizontal portion; and

a picture mount member having a horizontally extending



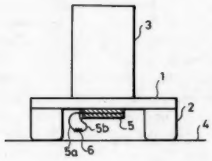
portion and being securable on one side thereof to the rear face of a horizontal frame member of a picture frame and having extending downwardly therefrom at right angles to the general axis of said horizontally extending portion a pair of spaced tongue members, each said tongue member being similarly configured to one of said two spaced similarly shaped apertures to engage and slide therewithin in close conformity therewith for securing said picture mount member to said T-shaped wall mount member.

4,883,248

SHOCK PREVENTING APPARATUS

Kenji Uchino, Yokohama, and Kazumasa Ohnishi, Nagaoka, both of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Sep. 15, 1988, Ser. No. 244,891
Claims priority, application Japan, Jan. 22, 1988, 63-12082
Int. Cl.[4] F16F *15/00*
U.S. Cl. 248—550 **14 Claims**



1. A vibration preventing apparatus comprising:

a supporting plate on which an object to be supported is mounted; and

a member fixed on said supporting plate, for supporting said supporting plate, wherein:

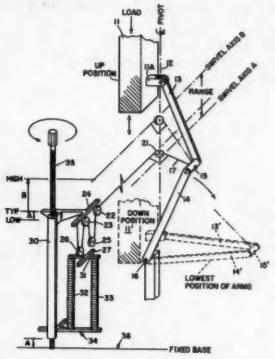
a piezoelectric effect element, to which electrodes a resistor having a predetermined resistance is connected, wherein the resistance of the resistor is selected such that a substantial amount of vibration energy received by the piezoelectric effect element is converted to heat energy, the piezoelectric effect element being attached to a surface of said supporting plate.

4,883,249

COUNTERBALANCING

Thomas A. Garland, 76 Reservoir Cir., Jamestown, R.I. 02835

Filed Feb. 4, 1987, Ser. No. 10,725
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—566 **19 Claims**



1. Counterbalancing apparatus comprising,

a weight W to be counterbalanced movable along a first axis,

means for supporting said weight W to be counterbalanced and movable along said axis,

at least one upper lever means for pivotal connection to said means for supporting at its upper end,

at least one lower lever means for pivotal connection at its lower end to an intermediate pivot point and pivotally connected at its upper end to the lower end of said upper lever means,

spring means for providing a counterbalancing force,

and means for coupling said spring means to an inside pivotal connection such that a force from said spring means lies along a second axis through said lower lever means in a direction intersecting said first axis,

the spring rate R_T of said spring means, the weight W to be supported on said means for supporting and the distance L between said inside pivotal connection and said lower level means lower end being related by the equation $R_T=2W/L$,

whereby said counterbalancing apparatus comprises a self-contained counterbalance mechanism that, neglecting minimal effects of friction, manufacturing inaccuracies and strains, substantially exactly counterbalances said weight W over the linear range of travel of said weight along said first axis.

4,883,250

VIBRATION-PROOF AND EARTHQUAKE-IMMUE MOUNT SYSTEM

Kenichi Yano, Tokyo; Hiroshi Midorikawa, Kanagawa; Toshiaki Kamei, Kanagawa, and Takeharu Shizume, Kanagawa, all of Japan, assignors to Kajima Corporation and Kayaba Industry Co., Ltd., both of Tokyo, Japan

Filed Mar. 10, 1988, Ser. No. 166,441
Claims priority, application Japan, Mar. 12, 1987, 62-58587
Int. Cl.[4] F16M *1/00*
U.S. Cl. 248—638 **8 Claims**

1. A vibration-proof and earthquake immune mount system connecting a structure to a foundation comprising a number of mounts for reducing vibrations of said structure in any direction and dampers for reducing horizontal vibrations of said structure provided between said structure and foundation,

each of said mounts comprising:

a spring means connected to a bottom surface of said structure;

a support mounted on a lower end of said spring means;

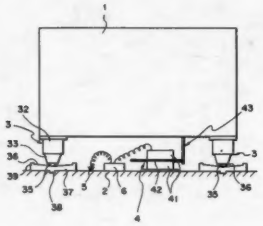
a ball means rollably abutting said support at an upper surface of said ball means;

a saucer mounted on said foundation, an upper surface of said saucer being in the form of a recess which receives a lower surface of said ball means in rollable contact; and

each of said dampers comprising:

an electromagnet with north and south poles mounted on said foundation;

a connector mounted on a bottom surface of said structure;



a conductor plate connected to said connector so as to be slidable in a vertical direction, the free end of said conductor plate being interposed between the north and south poles of said electromagnet;

a sensor for detecting movement of said foundation and for generating a signal when movement of said foundation exceeds a predetermined amount; and

a controller for receiving said signal from said sensor and for using said signal to control the electromagnet to develop a magnetic field which interacts with said conductor plate to produce eddy currents which generate a braking effect and absorb the disturbance energy when movement of said foundation exceeds a predetermined amount;

whereby horizontal vibrations may be absorbed.

4,883,251

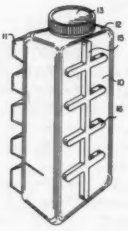
CONTAINER FOR MAKING ICE CUBES

Jorge F. Manas, c/Espronceda, 310-318, 08027Barcelona, Spain

Continuation of Ser. No. 59,968, Jun. 9, 1987, abandoned. This application Nov. 15, 1988, Ser. No. 273,182

Int. Cl.[4] F25C *1/24*; B65D *1/04*

U.S. Cl. 249—53 R **2 Claims**



1. Apparatus for making ice cubes comprising a generally prismatic one-piece self-supporting container of hollow configuration, the container having a base wall, front and back walls, opposite side walls, and a top wall, the front and back walls being wider than the side walls, the front wall being formed with rows of outwardly directed ice-forming cavities, each cavity having the shape of a truncated pyramid to allow an ice cube to be released therefrom by external pressure, inter-cavity walls with channels therein providing liquid flow communication between the cavities, a combination filling and emptying aperture in the top wall dimensioned to allow ice cubes released from the respective cavities to be discharged therethrough, a fill marking on one of the front, back and side walls to indicate a fill level for the ice-forming cavities when the container is oriented with said aperture facing upwards, and mutually perpendicular external stacking ribs on the back wall enabling a plurality of said containers to be stacked selectively in parallel and in mutually perpendicular relation, the apparatus further including a closure member for said aperture, the stacking ribs including an elongate spine extending substantially the entire length of the back wall and lateral ribs spaced along and extending outwardly from opposite sides of said spine.

4,883,252

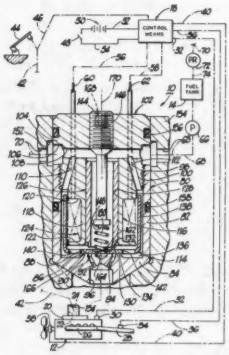
ELECTROMAGNET AND VALVE ASSEMBLY

Gerhard Mesenich, Bochum, Fed. Rep. of Germany, assignor to Colt Industries Inc., New York, N.Y.

Filed Jan. 23, 1989, Ser. No. 300,030

Int. Cl.[4] F16K *31/06*

U.S. Cl. 251—129.18 **6 Claims**



1. A valving assembly for cyclically permitting and terminating fluid flow, comprising stationary magnetic body means of magnetic material, said magnetic body means being formed as to have a first axis of revolution, pole piece means situated as to be centrally of and functionally stationary with respect to said magnetic body means, electrical coil means effective upon energization thereof to create a magnetic field, valve seat means, fluid flow passage means formed through said valve seat means, said pole piece means comprising a pole piece face portion, an armature-valve member situated generally between said pole piece face portion and said valve seat means, resilient means normally resiliently urging said armature-valve member in a first direction whereby said armature-valve member moves toward operative seating engagement with said valve seat means as to thereby terminate flow of said fluid through said fluid flow passage means, said armature-valve member being moved in a second direction opposite to said first direction and into contact with said pole piece face portion upon energization of said coil means thereby permitting flow of said fluid through said fluid flow passage means, said magnetic body means and said pole piece means functioning to provide a magnetic flux path loop about said electrical coil means upon energization thereof, wherein said flux path loop is comprised of a non-moving portion and of a moving portion, wherein said moving portion comprises said armature-valve member wherein said non-moving portion comprises said pole piece

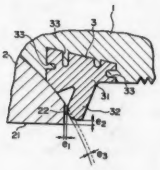
means and said stationary magnetic body means, and a gap of non-magnetic material having a second axis of revolution substantially aligned with said first axis of revolution, said gap of non-magnetic material forming a magnetic interruption in said non-moving portion for enhancing flux leakage in the vicinity of said gap of non-magnetic material thereby reducing the flux decay time in said flux path loop upon de-energization of said coil means and enabling said resilient means to move said armature-valve in said first direction, and wherein said armature-valve member is of cup-shaped configuration having an armature-valve axial end wall and an armature-valve cylindrical side wall.

4,883,253

BALL VALVE AND METHODS OF FABRICATION

Mitsuharu Hashimoto, and Shinji Takeda, both of Saitama, Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 561,867, Feb. 16, 1983, abandoned. This application Feb. 19, 1986, Ser. No. 830,492
Claims priority, application Japan, Dec. 16, 1982, 57-221636
Int. Cl.[4] F16K *5/00*
U.S. Cl. 251—315 **12 Claims**



1. A ball valve comprising: a generally spherically shaped ball having a shaft integrally attached to one side thereof, a flow passage being formed through said ball, a recessed surface being formed around said flow passage on either side of said ball extending inwardly beyond the spherical surface of said ball; a valve body made of a synthetic resin, said valve body having a flow passage extending longitudinally therethrough and provided with connecting means at outer ends of said flow passage in said valve body; a generally annularly shaped ball seat fixed to said valve body at a position surrounding said flow passage in said valve body, said ball seat having an inner generally annularly shaped lip extending into a recess defined by said recessed surface of said ball when said ball is in an open position without contacting said ball and in close contact with said ball to thereby bring said lip into sealing engagement with said ball when said ball is in a closed position irrespective of the flow pressure of the flow passage.

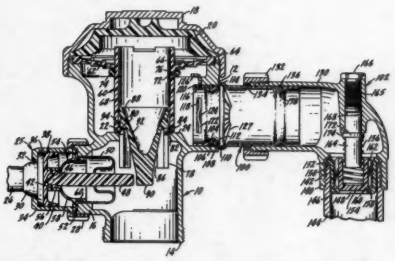
4,883,254

FLUSH VALVE HANDLE ASSEMBLY

John F. Whiteside, Franklin Park, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.

Filed Mar. 24, 1989, Ser. No. 328,326
Int. Cl.[4] F16K *31/145*
U.S. Cl. 251—335.2 **12 Claims**

1. An operator assembly for use in operating a plumbing fixture such as a flush valve, including a collar adapted to be attached to a flush valve body, an opening in said collar, an operator having a portion extending through said collar opening, a piston movable within said collar and having a surface thereof in contact with that portion of the operator which extends through said opening, a rod attached to said piston and formed and adapted to operate the flush valve, a diaphragm attached to said rod at a location remote from said piston, said diaphragm being movable with said rod and in sealing contact with the flush valve body, spring means urging said piston and rod to an unoperated position outwardly of the flush valve body, movement of said operator causing movement of said



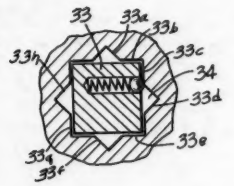
piston, rod and diaphragm inwardly toward the flush valve to cause operation thereof.

4,883,255

WINCH HANDLE

Walter H. Bacon, North Haven, Conn., assignor to Custom products Corporation, North Haven, Conn.

Filed Feb. 1, 1988, Ser. No. 150,888
Int. Cl.[4] B25G *3/28*; B66D *1/04*
U.S. Cl. 254—266 **3 Claims**



1. An operating handle for a winch having a four or eight-sided socket comprising a hand engaging portion, a lever arm and a driver, said driver being secured to an end of said lever arm at an end opposite to said hand engaging portion, said driver having a square shape and having a bore in one side thereof, a detent in said bore, a spring in said bore urging said detent outwardly of a side of said driver to engage a wall of a socket, said bore being positioned off the vertical center line of said side of said driver and so positioned that said detent will engage only one wall of an eight-sided socket.

4,883,256

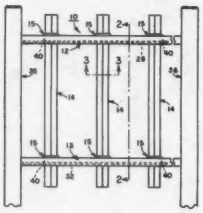
PICKET FENCE AND METHOD OF CONSTRUCTION

Thomas J. Hebda, 539 S. Park, Lombard, Ill. 60148

Filed Jan. 23, 1989, Ser. No. 299,674
Int. Cl.[4] B21F *27/00*
U.S. Cl. 256—22 **5 Claims**

1. A picket fence assembly, comprising in combination
upper and lower horizontal rails each having a plurality of non-circular through-holes therein,
a plurality of vertically disposed pickets arranged in mutually parallel relationship between said rails and extending through respectively aligned ones of said through-holes in said rails,
said pickets being respectively in said through-holes from an assembly position wherein said pickets are axially movable in said through-holes to a locking position wherein vertical movement of said pickets relative to said rails is prevented,
said pickets being provided with transverse through-holes

which are in mutual alignment when each of said pickets is in said locking position, and



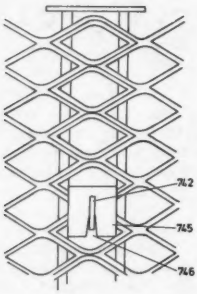
a rigid rod slidably extending through said transverse through-holes in said pickets to prevent rotation of said pickets from said locking positions to said assembly positions.

4,883,257

SECURITY FENCING

Brendan Bracken, 35 Oaklawn West, Leixlip, County Kildare, Ireland

Filed Jul. 24, 1987, Ser. No. 78,378
Claims priority, application Ireland, Jul. 25, 1986, 1968/86
Int. Cl.[4] E04H *17/10*
U.S. Cl. 256—54 **11 Claims**



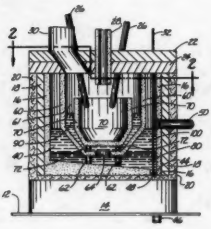
1. A post for security fencing, the post comprising a pair of longitudinal sections, the first longitudinal section being adapted to be fixed in the ground and having means for securing fence meshing thereto, the second longitudinal section being adapted to fit over the first longitudinal section, with complementary engaging means being provided for securing the first and second longitudinal sections together, said complementary engaging means being enclosed within the post when assembled, the complementary engaging means comprising at least one generally L-shaped bracket and a complementary locking plate; such an L-shaped bracket having a spine and a leg generally perpendicularly disposed to the spine, the end of the spine remote from the leg being fixed to an inner wall of the first longitudinal section with the leg being vertically disposed on erection of the longitudinal sections, and such a corresponding locking plate having a slot at its lower edge and being fixed in the second longitudinal section so as to be engageable with the corresponding L-shaped bracket of the first longitudinal section.

4,883,258

PLASMA FURNACE

Atwood P. Foster, 1220 NE. 17th, Portland, Oreg. 97232, and Allan L. Berg, 6504 SE. Reedway, Portland, Oreg. 97206

Filed Sep. 15, 1988, Ser. No. 244,316
Int. Cl.[4] F27B *15/00*
U.S. Cl. 266—148 **6 Claims**



1. A plasma furnace for removing precious metals from ore, said plasma furnace comprising:

a vessel having an upper chamber and a lower chamber in fluid communication therewith;

said upper chamber including:

a feed tube attached to said vessel and disposed to extend from exterior said vessel into said upper chamber for feeding ore, carbon and a plasma gas into said upper chamber;

three electrodes attached to said vessel and disposed to extend into said upper chamber at angles of about 120 degrees from each other, said electrodes having ends terminating radially outward from said feed tube, said electrodes being operably connected to a three phase alternating electric power source for producing a plasma arc;

a vent attached to said vessel, said vent providing fluid communication between said upper chamber and the exterior of said vessel;

a central crucible attached to said vessel and supported within said upper chamber below said feed tube such that the ends of said electrodes are disposed within said central crucible; and

an outer crucible attached to said vessel and disposed to surround said central crucible in spaced relationship thereto, said outer crucible defining the boundary between said upper chamber and said lower chamber, said outer crucible including a central discharge hole that provides fluid communication between said upper chamber and said lower chamber;

said lower chamber including:

a sloping floor inclined dowardly to a sump;

a drain tube attached to said vessel, said drain tube providing fluid communication between said sump and the exterior of said vessel;

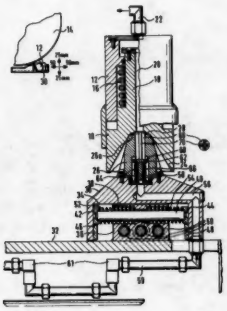
a valve disposed to selectively control the flow of fluid from said sump to said drain tube; and

an overflow tube attached to said vessel above the central discharge hole in said outer crucible, said overflow tube providing fluid communication between said lower chamber and the exterior of said vessel.

4,883,259
APPARATUS FOR COUPLING A METALLURGICAL LADLE TO A GAS SUPPLY

Hubert Stomp, Howald/Grand-Duchy; Jean-Pierre Barthel, Oberanven; Albert Feitler, Strassen, and Fred Parasch, Schifflange, all of Luxembourg, assignors to Paul Wurth S.A., Luxembourg, Luxembourg

Filed Dec. 15, 1988, Ser. No. 284,920
Int. Cl.[4] C21C *5/46*
U.S. Cl. 266—217 **11 Claims**



1. An apparatus for coupling a metallurgical ladle to a gas supply for treatment of molten metal contained in the ladle wherein gas is injected through the bottom of the ladle into the liquid metal at a treatment station and wherein the ladle rests on a ladle support, comprising:

base means mounted on said ladle support;

spring means associated with said base means to slide said base means in at least first and second directions, said first and second directions being mutually transverse to one another;

male connection head means having an axial passage therethrough, said male connection head means including means for communicating with a gas supply;

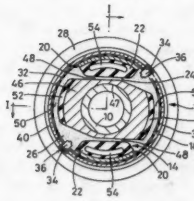
foot means for attachment to the ladle; and

female connection member means for engagement on said male connection head means when said ladle is positioned on said ladle support.

4,883,260
ELASTIC BUSHING HAVING FLUID CHAMBER FILLED WITH HIGHLY VISCOUS FLUID

Ryouji Kanda, Komaki, Japan, assignor to Tokai Rubber Industries, Ltd., Japan

Filed Sep. 12, 1988, Ser. No. 242,823
Claims priority, application Japan, Sep. 16, 1987, 62-231587
Int. Cl.[4] F16F *1/36;* **F16M** *13/00;* **B60G** *11/26*
U.S. Cl. 267—140.1 **12 Claims**



1. A fluid-filled elastic bushing to primarily damp vibrations applied in an axial direction of the elastic bushing, comprising:

an inner sleeve;

an outer sleeve disposed radially outwardly of said inner sleeve;

an annular elastic body interposed between said inner and outer sleeves, for elastically connecting said inner and outer sleeves;

said elastic body including a pair of axially intermediate connecting portions which define a first pair of diametrically opposed parts of an outer circumferential surface of the elastic body, said elastic body having an opening formed through an axially intermediate portion thereof in a diametric direction thereof such that said opening is partially defined by said connecting portions and is open in a second pair of diametrically opposed parts of said outer circumferential surface of the elastic body which are located between said pair of connecting portions in a circumferential direction of the elastic body, said opening being closed by said outer sleeve, at said second pair of diametrically opposed parts of said outer circumferential surface of said elastic body, whereby a fluid chamber filled with a viscous fluid having a high kinematic viscosity is defined around an axially intermediate portion of said inner sleeve;

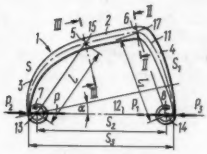
a restrictor member supported by said inner sleeve such that said restrictor member is accommodated within said fluid chamber, so as to substantially divide said fluid chamber into two parts spaced apart from each other in an axial direction of said inner sleeve, said restrictor member cooperating with said pair of axially intermediate connecting portions of said elastic body, to define a first pair of restricted portions of said fluid chamber, respectively, said two parts of said fluid camber communicating with each other through said first pair of restricted portions; and

said pair of axially intermediate connecting portions of said elastic body having respective axial holes formed therethrough.

4,883,261
ZAMITTER BLADE SPRING

Mikhail N. Zamitter, ulitsa Aviatsii, 2/32, korpus 4, kv. 18, Kiev, U.S.S.R.

PCT No. PCT/SU86/00115, § 371 Date Jul. 12, 1988, § 102(e) Date Jul. 12, 1988, PCT Pub. No. WO88/03616, PCT Pub. Date May 19, 1988
PCT Filed Nov. 13, 1986, Ser. No. 241,986
Claims priority, application U.S.S.R., Feb. 20, 1984, 3713661
Int. Cl.[4] B60B *11/00*
U.S. Cl. 267—158 **7 Claims**



1. A Zamitter blade spring made from a resilient blade having a length and having cross sections along the length thereof which define centers of gravity arranged in one plane and on one line which substantially corresponds to a neutral line of the spring, the linear dimensions of said resilient blade cross sections being variable along the length thereof, said resilient blade comprising a midportion and end portions joined to said midportion, said end portions having neutral lines which are divergent from a neutral line of said midportion to one side in their common plane, said end portions having free ends which include eyes for receiving elements to provide pivotable connections to the blade spring, longitudinally extending axes of said eyes being perpendicular to the plane containing the neu-

tral line of the spring, said end portions (3, 4) of the resilient blade (1) being of different relative length (S, S_1).

4,883,262

DEVICE CONTAINING A FORCE-IMPARTING MEANS AND EQUIPPED WITH SAFETY MEANS

Michael A. Calvert, Kirkcaldy, Great Britain, assignor to Prime Actuator Control Systems Limited, Glenrothes, Great Britain

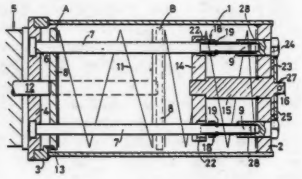
PCT No. PCT/GB87/00214, § 371 Date Feb. 1, 1988, § 102(e) Date Feb. 1, 1988, PCT Pub. No. WO87/05986, PCT Pub. Date Oct. 8, 1987

PCT Filed Mar. 30, 1987, Ser. No. 126,110

Claims priority, application United Kingdom, Apr. 1, 1986, 8607879

Int. Cl.[4] F16P *3/08*; F10J *13/24*

U.S. Cl. 267—175 **4 Claims**



1. A device comprising a housing including an end plate, means for imparting a force and captive within the housing between the end plate and removable retaining means biased by the force imparting means, a plurality of screw-threaded tie rods and nuts holding the end plate in assembly in the housing, and safety means comprising a safety plate within the housing at a fixed spacing from the end plate, but short of the retaining means at the closest approach of the retaining means to the end-plate, the safety plate being fast on a shaft rotatable in the end plate and adapted to be turned from outside the housing, the safety plate having keyhole-shaped openings through which the respective tie rods extend and the tie rods each having a safety collar which in one angular position of the safety plate can pass through the respective keyhole-shaped opening but in another angular position of the safety plate cannot pass through the keyhole-shaped opening.

4,883,263

MOLECULAR JOINT FOR AXLE STRUTS AND CONNECTING RODS AND SIMILAR PARTS OF MOTOR VEHICLES

Reinhard Buhl, Bohmte, Fed. Rep. of Germany, assignor to Lemförder Metallwaren AG, Lemförder, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 191,276

Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715360

Int. Cl.[4] B60G *11/18, 7/02*; B62D *7/16*

U.S. Cl. 267—293 **7 Claims**

1. A molecular joint for axle struts, connecting rods, and similar parts of motor vehicles comprising:

a hollow housing having a substantially cylindrical interior surface;

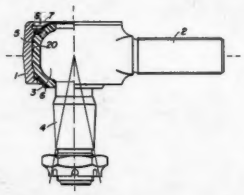
a substantially ball-shaped joint pivot in said housing lying roughly along a middle axis of said housing;

a sleeve-like joint body of elastomer material arranged between said housing and said joint pivot and adhering to said housing and to said joint pivot under a prestressing;

said interior surface defining a top portion, a bottom portion, and a middle portion;

said interior surface including a first end wall arranged at a first distance from said middle axis and a second end wall arranged at a second distance from said middle axis, said second end wall being further away from said middle axis than said first end wall, said first end wall occupying said top portion and said bottom portion of said interior surface, and said second end wall located in said middle portion of said interior surface;

a first joint body portion being between said first end wall and said joint pivot providing said joint body with a first prestressed region, a second joint body portion being



between said second end wall and said joint pivot providing said joint body with a second prestressed region, said first pre-stressed region being substantially more prestressed than said second prestressed region so that small radial loads are transmitted to the first prestressed region and large radial loads are transmitted to the second prestressed region.

4,883,264

BILL DISBURSING SYSTEM

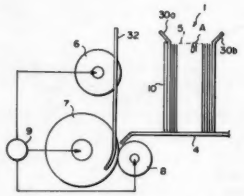
Eiichi Yoshikawa, Hasuda; Takashi Shinozaki, Kashiwa, and Takahiko Ito, Yokohama, all of Japan, assignors to Laurel Bank Machines Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1988, Ser. No. 264,798

Claims priority, application Japan, Nov. 2, 1987, 62-277897

Int. Cl.[4] B65H *7/08*

U.S. Cl. 271—110 **15 Claims**



1. A foreign substance disposing device for a money receiving and disbursing machine comprising stationary clip means and movable clip means for clipping bills therebetween, pick out means for picking out the bills which are clipped between said stationary clip means and movable clip means, pick out control means for controlling an operation of said pick out means, coil means provided on circuit board means for producing a change in impedance in response to passing of the bills, impedance detecting means for detecting the change in the impedance of the coil means, control signal output means for judging whether or not the bills passing the coil means are accompanied by a foreign substance based on signals from said impedance detecting means and for providing said pick out means with a control signal for preventing the pick out means from picking the bills out when a foreign substance is detected, and alarm means for receiving signals from said output means and producing an alarm signal.

4,883,265

TRAY APPARATUS

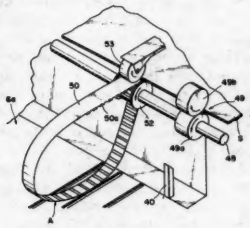
Noriyoshi Iida, Ichikawa; Nobutaka Uto, Yokohama; Masakazu Hiroi, Tokyo, and Akimitsu Hoshi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 839,603, Mar. 14, 1986, abandoned. This application Jul. 28, 1988, Ser. No. 226,551

Claims priority, application Japan, Mar. 15, 1985, 60-052055; Mar. 18, 1985, 60-055486; Mar. 20, 1985, 60-057139

Int. Cl.[4] B65H *31/26*

U.S. Cl. 271—220 **11 Claims**



1. A tray apparatus, comprising:

a sheet discharging outlet provided with a rotatable member for discharging sheets;

a tray for receiving and stacking sheets discharged from said sheet discharging outlet, said tray being provided with a stopper at a side adjacent said sheet discharging outlet; and

a rotatable endless belt disposed adjacent said sheet discharging outlet and having a part disposed opposite to a top surface of said tray, said endless belt having a first travel portion for contacting the bottom surface of a sheet being discharged through said sheet discharging outlet, for conveying the sheet in a direction of sheet discharge, and for contacting the rear end of the sheet to convey it downwardly to said tray, said endless belt also having a second travel portion for contacting a top surface of the sheet which is being discharged to convey the sheet back in the opposite direction so as to abut it to the sheet stopper.

4,883,266

AUTOMATIC DOCUMENT FEEDER IN ELECTROPHOTOGRAPHIC COPYING MACHINE

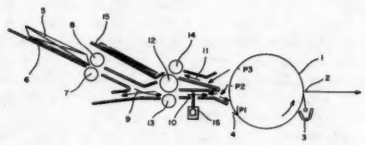
Yoshihal Fujii, Sakurai, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 68,802, Jun. 29, 1987, abandoned, which is a continuation of Ser. No. 877,392, Jun. 23, 1986, abandoned. This application Jun. 23, 1988, Ser. No. 212,041

Claims priority, application Japan, Jul. 16, 1985, 60-159141

Int. Cl.[4] B65H *39/10*

U.S. Cl. 271—291 **5 Claims**



1. An automatic document feeder in a copying machine comprising

an endless document recycling path having thereon a document receiving position at which a document is introduced into said recycling path and a document releasing position where a document is released from said recycling path,

document circulating means for transporting a document through said recycling path in a fixed direction from said document receiving position to said document releasing position,

a passageway with one end disposed near said document receiving position and said document releasing position, and

document transporting means for transporting a document through said passageway selectably in a normal direction towards said document receiving position or in a reverse direction opposite to said normal direction from said document releasing position,

said recycling path, said passageway and said document circulating means being so arranged with respect to one another that a document which is transported in said reverse direction through said passageway after moving through said recycling path is facing oppositely to when said document is transported in said normal direction through said passageway prior to moving into and through said recycling path.

4,883,267

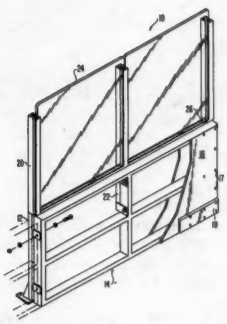
DASHER BOARD SYSTEM

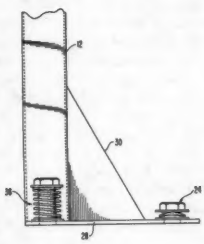
John S. Burley, Salix, Pa., assignor to Burley's Rink Supply, Salix, Pa.

Filed Jul. 1, 1988, Ser. No. 214,433

Int. Cl.[4] A63C *19/06*

U.S. Cl. 272—3 **10 Claims**





1. A dasher board system for an ice rink comprising:

a plurality of main supports anchored around the periphery of the ice rink;

a plurality of dasher panel frame segments supported by said supports and connected together to form a continuous framework around the periphery of the ice rink;

a plurality of dasher board facing panels supported by said continuous framework; and

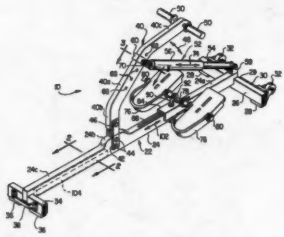
an adjustable shock absorbing means anchoring each of said main supports to the ice rink substrate for providing a desired degree of resilience to said dasher board panels, wherein said adjustable shock absorbing means includes a spring loaded fastening element having a bolt with a head portion and a threaded portion and a spring disposed concentrically around said threaded portion, so that when said bolt is tightened, the resilience of said dasher board panels is reduced, and wherein each of said main supports has a support base, each of said support bases having first and second holes for receiving two of said spring loaded fastening elements therein, and wherein each of said support bases further comprises a third hole for receiving a third, non-spring-loaded, fastening element, said third fastening element having a spring washer.

4,883,268

COMPACT, PORTABLE, ROWING TYPE EXERCISE APPARATUS USABLE BY A CHAIR-SEATED EXERCISER

Harry Salkind, Dallas, Tex., assignor to McCabe-White Investment Corporation, Dallas, Tex.

Filed Apr. 12, 1989, Ser. No. 336,835
Int. Cl.[4] A63B *69/06*
U.S. Cl. 272—73 **14 Claims**



1. Compact, portable, seatless rowing type exercise apparatus usable by an exerciser seated in a chair or the like having a pair of support portions resting upon a floor surface and disposed on opposite sides of an elevated seat, said exercise apparatus comprising:

an elongated base structure having a front longitudinal portion with an outer end, a longitudinally intermediate portion, and a rear longitudinal portion with an outer end,

said rear longitudinal portion consisting essentially of an outer end portion, a handle means mounted on said outer end portion, an elongated connecting portion connecting said outer end portion to said longitudinally intermediate portion of said base structure and a counterweight means operatively connected to said elongated connecting portion,

said base structure having a use orientation in which it longitudinally extends along and is supported by the floor surface, with said rear longitudinal portion extending rearwardly between the support portions of the chair beneath its seat, and the balance of said base structure extending forwardly beyond the chair along the floor surface;

an elongated, upstanding force input lever pivotally connected at an inner end thereof to said longitudinally intermediate portion of said base structure for forward and rearward pivotal movement relative thereto, in a generally rowing-like fashion, about a horizontal axis generally transverse to the length of said base structure, said force input lever having an outer end portion to which handgrip means are secured that may be grasped by an exerciser sitting in the chair and pushed and pulled to respectively impart said forward and rearward pivotal movement to said force input lever;

resistance means operatively connected between said base structure and said force input lever for yieldingly resisting both said forward pivotal movement and said rearward pivotal movement of said force input lever relative to said base structure;

footrest means, carried by said front longitudinal portion of said base structure between its outer end and said longitudinally intermediate portion of said base structure, for supporting the feet of the seated exerciser;

rolling support means, secured to said outer end of said front longitudinal portion of said base structure, for rollingly supporting said outer end of said front longitudinal portion on the floor surface when said base structure is forwardly and upwardly tipped, said rolling support means being spaced upwardly apart from the floor surface when said base structure is in its use orientation;

said handle means being associated with said outer end portion of said rear longitudinal portion of said base structure and liftable to forwardly and upwardly pivot said base structure to thereby operatively engage said rolling support means with the floor surface to permit said exercise apparatus to be easily rolled therealong to a storage location; and

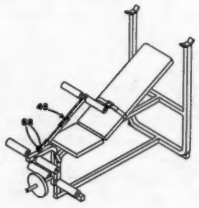
said counterweight means, being operatively connected to said rear longitudinal correcting portion of said base structure, for inhibiting forward and upward tipping of said base structure during forward pivotal motion of said force input lever relative to said base structure with said base structure in its use orientation.

4,883,269

ATTACHMENT FOR EXERCISE BENCH

Conroy Shaver, P.O. Box 284, Bengough, Saskatchewan, Canada 50C 0K0

Filed May 9, 1988, Ser. No. 192,250
Int. Cl.[4] A63B *21/06*
U.S. Cl. 272—117 **12 Claims**



1. An exercise apparatus comprising:

a bench;

at least one L-shaped arm pivotally mounted on an end of the bench for pivotal movement about a lateral arm axis between a rest position with a first part of the arm projecting substantially horizontally from the end of the bench and a second part of the arm projecting downwardly therefrom, and an elevated position in which the first part of the arm projects upwardly from the bench and the second part projects from the end of the bench;

means connected to the second part of the arm for resisting the upward pivoting movement of the arm;

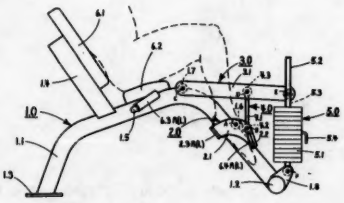
a tension link connected to the first part of the arm at a single position spaced from the end of the bench for free pivotal movement with respect to the arm, the link being otherwise unconnected to the apparatus; and

a link crossbar connected to the link remote from its connection to the arm.

4,883,270
FOUR-BAR VARIABLE-RESISTANCE FRONTAL CALF DEVELOPING MACHINE

Henry H. Maag, 5332 Clark Cir., Westminster, Calif. 92683

Filed Feb. 9, 1989, Ser. No. 308,192
Int. Cl.[4] A63B *21/00*
U.S. Cl. 272—134 2 Claims



1. A frontal calf exercising machine, comprising:

a rigid frame which includes means for supporting an operator in a seated position of operation;

a rigid rotating foot-engaging assembly which is journaled in said frame on an axis which is approximately common with the axes of rotation of said operator's ankle joints while said operator is supported in said machine's frame in the operating position;

said rigid rotating foot-engaging assembly includes both top and heel-of-the-foot engaging surfaces which, through body-machine contact, apply resistive forces to the respective tops and heels of the operator's feet through circular paths about the rotational axes of the operator's ankle joints;

a rigid rotating weight arm which is journaled in said machine's frame on an axis which is both parallel with and separated by a specific distance from the axis of rotation of said rigid rotating foot-engaging assembly;

said rigid rotating weight arm includes means for loading weights onto at a point offset from its axis of rotation;

said rigid rotating foot-engaging assembly and said rigid rotating weight arm are mechanically linked to each other at axes which are both parallel with and offset by specific distances from their respective axes of rotation by a rigid connecting link which has a specific length between its centers of connection;

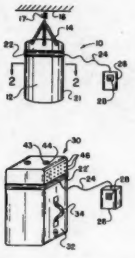
said rigid rotating foot-engaging assembly, said rigid rotating weight arm, said link mechanically joining said rigid rotating foot-engaging assembly and said rigid rotating weight arm, and said frame of said frontal calf exercising machine join together to form a four-bar linkage which, when acting in conjunction with the sinusoidally changing values of force applied by the machine's rotating weight arm as the applied weight swings through a circular path through the gravitational field, applies a predetermined variably resistive force at the top and heel-of-the-foot engaging surfaces on said rigid rotating foot-engaging assembly, which varies as a function of the degrees of rotation of the operator's ankle joints and which is characteristic of the releationships in length and orientation of the four rigid members forming the four-bar linkage and the orientation of the rotating weight arm to the gravitational field throughout the range of the exercise movement;

said specific distance between the axis of rotation of said rigid rotating foot-engaging assembly and the axis of rotation of said rigid rotating weight arm, said specific distance between the axis of rotation of said rigid rotating foot-engaging assembly and the axis of connection of said connecting link on said rigid rotating foot-engaging assembly, said specific distance between the axis of rotation of said rigid rotating weight arm and the axis of connection of said connecting link on said rigid rotating weight arm, and said specific distance between the centers of connection on said connecting link all have a definite non-changing relationship to each other, which relationship, along with their orientations to each other, is determined through kinematic analysis of the moving parts of the four-bar linkage age/rotating weight arm force-varying mechanism and is dependent on said predetermined variably resistive force which said four-bar linkage / rotating weight arm force-varying mechanism is designed to put out throughout the exercise movement.

4,883,271
SPORTS IMPACT MEASURING APPARATUS

Barry J. French, Bay Village, Ohio, assignor to French Sportech Corporation, Bay Village, Ohio

Continuation-in-part of Ser. No. 785,969, Oct. 10, 1985, Pat. No. 4,761,005, and a continuation-in-part of Ser. No. 904,356, Sep. 8, 1986, Pat. No. 4,824,107. This application Apr. 18, 1988, Ser. No. 182,913
Int. Cl.[4] A63B *67/00, 69/00*
U.S. Cl. 273—1 GC 24 Claims



21. A flexible transducer means for measuring at least one characteristic of a sports impact on a resilient support for receiving such impacts, said resilient support comprising a resilient material compressible at the region of impact and expandable at parts of said support away from the region of impact, said means including a flexible means for generating an electrical signal having at least one characteristic varying in accordance with the extent of movement of the resilient support, and means for holding said flexible means relative to the expandable parts of said resilient support to detect such movement.

4,883,272
BALL CATCHING FRAME WITH BALL EXPELLING MACHINE CONNECTED THERETO

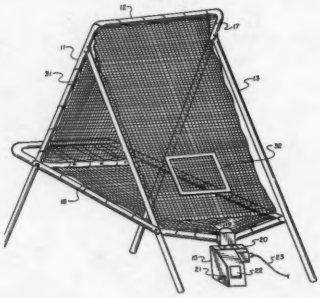
William C. Lay, 931 Creek Hill La., Midvale, Utah 84047

Filed May 2, 1988, Ser. No. 189,103
Int. Cl.[4] A63B *69/40*
U.S. Cl. 273—26 A 12 Claims

1. A multi-purpose ball expelling apparatus that can be used with repeated operations for the training of baseball fielders, batters and pitchers comprising in combination a netted frame joined to a ball expelling machine,

(a) the said netted frame comprising an inverted U shaped frame having two separate legs as the sides of the inverted U, each leg having a support brace one end of which is adjustably attached near the top of each leg and the other end of the brace resting on the ground so as to maintain the inverted U shaped frame in a forwardly inclined position, a rectangular frame having two sides, a back and front section, the front end of the two opposite sides of said rectangular frame being adjustably joined between and to the said support braces from about 10 to 25 inches above the bottom of said braces, and the back end of said

opposite sides being adjustably joined between and to the legs of the inverted U shaped frame at a position so as to have the rectangular frame sloping downward and said back ends of the opposite sides extending beyond the legs and joining the back end of the rectangular frame so as to form a reinforcement section to said frame, and the front section of the rectangular frame being formed in a V shape and being fixedly attached to and within the braces at about 10 to 25 inches from the bottom of said braces, and having means for attaching a ball expelling machine at the point of the V, a tight net being joined to all sides of the rectangular frame with an opening near the point of the V at the front of said frame to permit any ball on the net to drop down the opening, a tight net being attached between the legs of the inverted U shaped frame, and a net being attached to the top of the inverted U shaped frame and loosely hanging down so that the bottom end touches the net on the rectangular frame,



(b) a ball expelling machine being firmly attached to and under the front end of the rectangular frame at the point of the V, said machine comprising a housing with an opening at the top positioned directly under the opening in the net at the point of the V on the front section of the rectangular frame, a power driven wheel in said housing positioned such that the outer circumference edge of the wheel strikes the outside cover of any ball dropping down the opening and forcefully pushes it forward along the inside of the housing, a curved ledge following the contour of the wheel but under the wheel and positioned so as to direct any pushed ball into an outward direction towards an opening in the front side of the housing, an adjustable lever at the end of the curved ledge that can be adjusted to change the slope of the ball as it exits the opening in the housing.

4,883,273

TOY-GAME APPARATUS

Toshio Kobayashi, Chiba Prefecture, Japan, assignor to Asahi Corporation, Tokyo, Japan

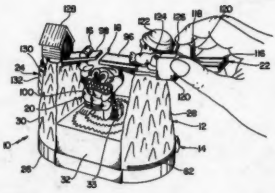
Filed Nov. 18, 1988, Ser. No. 273,222

Claims priority, application Japan, Nov. 21, 1987, 62-178206[U]

Int. Cl.[4] A63B *67/14;* A63F *9/00*

U.S. Cl. 273—110 **10 Claims**

1. A toy-game apparatus comprising a base, a timer on said base actuatable for a set period of time, a plurality of game elements, slide means on said base, said slide means having an upper end and a lower end and being operative during said set period of time in a downwardly inclined normal position wherein when said slide means is subtantially stationary a game element positioned thereon at a point adjacent the upper end thereof is gravitationally movable thereon to a point adjacent the lower end thereof, said slide means being movable from the normal position thereof to an interfering position for interfering with the movement of a game element thereon and being further movable to an interrupted position wherein sliding movement of a game element thereon from a point adjacent the upper end thereof to a point adjacent the lower end thereof is prevented, means for moving said slide means between the



normal and interfering positions thereof during said set period of time to interface with the movement of game elements thereon and means for moving said slide means to the interrupted position thereof upon the expiration of said set period of time.

4,883,274

GOLF CLUB HEAD WITH VARIABLE CENTER OF GRAVITY

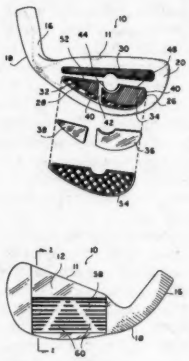
James C. Hsien, 1457 St. James Pkwy., Concord, Calif. 94521

Filed Sep. 15, 1988, Ser. No. 244,480

Claims priority, application Taiwan, Dec. 31, 1987, 76212463

Int. Cl.[4] A63B *53/08*

U.S. Cl. 273—164 **3 Claims**



1. A golf club head comprising:

a substantially vertical hosel adapted for attachment to a shaft;

said head having horizontal top and sole portions extending between a toe portion and heel portion with an inclined front face in a single plane and curved back face;

said back face having a contour of variable radii of curvature from a larger radius at the top horizontal portion of the head to a smaller radius of curvature at the horizontal sole portion of the head;

said back face comprising recesses inset in said back face of larger radius of curvature including one upper long recess and two lower separate shorter recesses with two rims in the same plane and coextensive with and just below the upper recess;

said lower recesses being capable of retaining a plurality of additive mass means and being completely separated by a

vertical partition, the bottom thereof being flat and substantially parallel to the contour of the back face;

additive mass means for insertion in only said two lower recesses;

a fourth recess comprising said lower recesses and having in the contour of very large radius of curvature a further rim separated from the plane of the rims of said two lower recesses, said rim of said fourth recess being outside the rims of the two lower recesses in countersunk fashion;

a cover element for insertion in said fourth recess to cover said additive mass means while being flush with said contour of said back face with said larger radius of curvature; and

said inclined front face having horizontal lines inscribed thereon and unmachined lines defining a triangle disposed amid said lines.

4,883,275

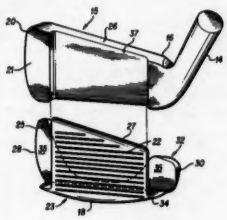
GOLD CLUB IRON HEAD

David D. Boone, El Toro, Calif., assignor to Lynx Golf, Inc., City of Industry, Calif.

Continuation-in-part of Ser. No. 59,212, Jun. 8, 1987, abandoned, which is a continuation of Ser. No. 887,735, Jul. 21, 1986, abandoned. This application Mar. 11, 1988, Ser. No. 167,209

Int. Cl.[4] A63B *53/04*

U.S. Cl. 273—172 **2 Claims**



1. A golf club iron head **(10)** defining a hosel **(14)** coupled to a heel portion **(16)**, said heel portion **(16)** being coupled to a toe portion **(20)** by a sole portion **(18)**, and a ball striking surface **(22)** located between said toe **(20)** and heel **(16)**, comprising:

a first unitary member **(15)** defining the hosel **(14)**, and a front portion of said heel **(16)** and a toe portion **(21)** of said head **(10)**, said first unitary member **(15)** having a recess **(37)** formed between said heel **(16)** and toe **(21)** front portions defining a substantially planar surface, said planar surface of said recess **(37)** being substantially parallel to said striking surface of said head **(10)**;

a second unitary member **(23)** having (a) a front face member **(27)** defining said ball striking surface **(22)**, (b) said sole **(18)**, and (c) an integral backweight **(32)** extending upward from said sole **(18)** in rearwardly spaced parallel relation to said front face member **(27)** and defining a rear portion of said heel **(30)** and a rear portion of said toe **(28)**, wherein said backweight is substantially continuous from said heel to said toe; said second unitary member **(23)** having a channel **(34)** formed between said backweight **(32)** and said front face member **(27)**;

said channel **(34)** receiving said first unitary member **(15)** and said recess **(37)** receiving said front face member **(27)** to form a contiguous frontal surface of said head **(10)**, wherein said toe **(21)** and heel **(16)** portions of said first unitary member **(15)** are substantially coplanar with said ball striking surface **(22)** of said second unitary member **(23)**, said front face member **(27)** having an upper edge substantially coplanar with an upper surface of said first unitary member **(15)**;

the weight density of said second unitary member **(23)** being greater than the weight density of said first unitary member **(15)**;

whereby said front face member **(27)** is matingly engaged within said recess **(37)** for locking engagement with said first unitary member **(15)** in a transverse direction with respect to a direction line substantially orthogonal to said ball striking surface **(22)**.

4,883,276

GOLF AID

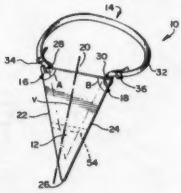
Len T. Brown, 7 Ridge Drive, Heuwelkruin, KNYSNA, Cape Province, South Africa

Filed Aug. 2, 1988, Ser. No. 227,237

Claims priority, application South Africa, Aug. 4, 1987, 87/5754

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—183 B **5 Claims**



1. A golf aid which comprises a harness and a structure to the upper part of which said harness is connected, said harness being in the form of a horizontally extending loop which enables said structure to be worn over the chest region with the harness extending around the user's back, the harness being secured to said structure at two horizontally spaced locations, the structure lying in a substantially vertical plane and hanging downwardly from where the harness is connected to it to a downwardly pointing apex which is offset horizontally from a vertical centre line which is equi-distant horizontally from said two locations at which the harness is attached to the structure.

4,883,277

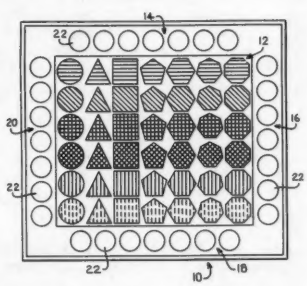
EDUCATIONAL BOARD GAME FOR TEACHING MATHEMATICS AND LOGIC

Thomas J. Laisure, 9113 W. 69th Ter., Merriam, Kans. 66204

Filed Sep. 30, 1988, Ser. No. 252,610

Int. Cl.[4] A63F *3/06*; G09B *19/22, 19/02*

U.S. Cl. 273—236 **2 Claims**



1. A method of playing an educational board game comprising the steps of:

providing a game board having a field of individual indicia thereon;

generating a random symbol; partially removing a card from a container by an amount and in a manner sufficient to reveal a number fewer than all of a plurality of indicia on the card, each of the indicia of the plurality being identical to one of the indicia in the field, the number of indicia revealed corresponding to the random symbol;

positioning a marker on one of the indicia within the field on the game board to indicate a player's predicition of a designated indicia to be subsequently revealed on the card; and

further removing the partially removed card from the container to reveal further indicia on the card for comparison with the player's choice.

4,883,278

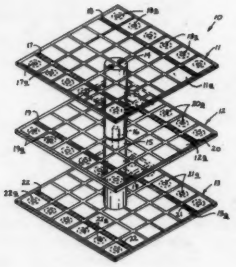
MULTI-LEVEL GAME

Philip A. Scott, 2901 1st St., Marion, Iowa 52302

Filed Aug. 10, 1988, Ser. No. 230,518

Int. Cl.[4] A63F *3/00*

U.S. Cl. 273—241 **6 Claims**



1. A method of playing a multi-level game by two opposing players comprising,

providing a game board including an upper, central and bottom game board wherein each game board is symmetrical, planar, and vertically aligned with one another, and

providing a first and second set of tokens of different coloration with one set utilized by each of said opposing players, and

providing a six-sided die with each face of said die of a different coloration, and

providing six decks of cards wherein each deck is of a different coloration relative to one another and corresponding to a like coloration on each face of said six-sided die, and

initially positioning said first and second tokens by said opposing players on respective ends of respective upper, central, and bottom game boards, and

each player alternatively rolling said die and thereafter moving a respective token relative to instructions imprinted on a top card selected from one of said six decks consistent with the coloration indicated upon the top face of the die subsequent to rolling said die.

4,883,279

SEALING SYSTEM

Robert C. Sabo, 291 Indian Paintbrush #3, Casper, Wyo. 82604

Filed Sep. 8, 1987, Ser. No. 93,770

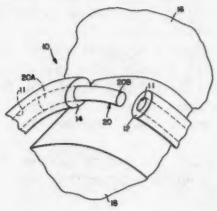
Int. Cl.[4] F16J *15/18*; B65Q *53/00*

U.S. Cl. 277—1 **16 Claims**

7. A sealing system for application around a rotatable shaft extending outwardly from a bearing housing, said system comprising:

(a) a length of hollow flexible tubular sealing material having a longitudinal interior cavity therein;

(b) a length of solid flexible substantially arcuate connecting material having a uniform diameter approximately equal to the diameter of said cavity in said sealing material; said connecting material being adapted to be inserted into said cavity in a manner such that abutting ends of said sealing material are aligned by said connecting material; and



(c) adhesive on said connecting material and on said sealing material for adhering said connecting material in said cavity of said sealing material and for adhering said sealing material to said bearing housing completely around said shaft.

4,883,280

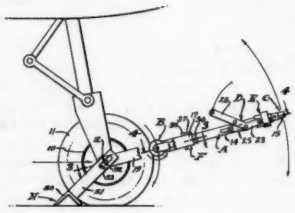
TOWBAR AND COME-ALONG FOR LIGHT AIRCRAFT

Fredrick W. Christian, 10317 Havenhurst, Granada Hills, Calif. 91344

Filed Jun. 16, 1988, Ser. No. 207,220

Int. Cl.[4] B64F *1/04*

U.S. Cl. 280—3 **10 Claims**



1. A towbar and come-along for ground handling light aircraft and the like having a ground engaging wheel free to rotate on an axle axis, and including;

a tongue extending on a radius from

the axle axis of the wheel,

trunnion means

mounted on said tongue and pivotally attaching the tongue to the wheel axle for manipulation to tow the aircraft,

a slide carried by and rotatable with the tongue,

and ratchet means mounted on an end of the slide and engageable with a periphery of the wheel to rotate the wheel in one direction and rotatable 180° with the tongue to reverse the ratchet means and rotate the wheel in the other direction,

the tongue and ratchet means cooperatively forming a second class lever having its fulcrum at the axle axis of the wheel and resistance to torque at the periphery of the wheel when manual force is applied to rotate the tongue about said axle axis of the wheel.

4,883,281

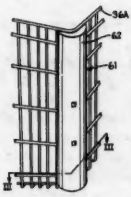
ELASTOMERIC VERTICAL CORNER BUMPER FOR SHOPPING CART

Dewey J. Waterman, Ceresco, Mich., assignor to United Steel & Wire Company, Battle Creek, Mich.

Continuation of Ser. No. 270,362, Nov. 14, 1988, abandoned. This application Apr. 14, 1989, Ser. No. 338,542

Int. Cl.[4] B62B *3/00*

U.S. Cl. 280—33.992 **9 Claims**



1. In a shopping cart having a wheeled base and an upwardly opening basket mounted on said base in upwardly spaced relationship therefrom, said basket including a front wall which extends between and rigidly joins to a pair of sidewalls and to a bottom wall, said front wall where it joins to the side walls defining a pair of front corners, said front and side walls being of a meshlike construction formed from a plurality of transversely extending rods which intersect and are joined together, said plurality of rods including a plurality of substantially horizontally extending rods which are vertically spaced apart, said plurality of horizontally extending rods including a first rod which defines the upper edge of the side and front walls and a second rod which is generally parallel to the first rod but spaced downwardly therefrom by a small vertical extent, said plurality of substantially horizontal rods including a third rod which extends along the side and front walls and is the lowermost one of said plurality and is spaced upwardly only a small distance above said bottom wall, said plurality of horizontal rods also including fourth and fifth rods which are vertically spaced from one another and are vertically spaced between said second and third rods, and a bumper arrangement attached to said basket in the vicinity of each said front corner, the improvement wherein said bumper arrangement comprises:

a vertically elongated striplike bumper formed of a plastics materials having limited elasticity for permitting elastic deformation due to impacts thereagainst, said bumper being positioned closely adjacent the exterior side of said front corner and extending along substantially the full vertical extent of said corner;

said bumper having a substantially L-shaped cross section defined by a pair of approximately perpendicularly extending leg parts joined by a curved corner part, said bumper having an inner surface which is adapted to abuttingly engage the horizontal rods defining said basket in the vicinity of said front corner, said inner surface having a configuration which closely corresponds to the configuration of said corner so that said bumper closely conforms to said front corner;

said bumper having a plurality of mounting flanges integrally molded therewith and projecting outwardly from said inner surface in generally perpendicular relationship thereto, said plurality of mounting flanges being disposed in generally vertically aligned but vertically-spaced relationship along said inner surface, each said mounting flange being defined by a platelike rib which projects outwardly from the inner surface in the vicinity of the curved part with said rib being integrally joined to and extending between said leg parts, each said mounting flange having an opening extending vertically therethrough substantially in alignment with similar openings formed in the other mounting flanges;

said plurality of mounting flanges including a pair of upper mounting flanges which are vertically spaced apart by a slot which opens horizontally, said slot having a vertical width which approximately equals the diameter of said second rod for accommodating said second rod therein, the uppermost one of said pair of upper mounting flanges being disposed closely adjacent but spaced downwardly a small distance from the upper end of said striplike bumper;

said plurality of mounting flanges including a pair of lower mounting flanges which are vertically spaced apart by a slot which opens horizontally and has a vertical height which approximately equals the diameter of said third rod for accommodating said third rod therein, the lowermost one of said lower mounting flanges being disposed closely adjacent the lower end of said striplike bumper; and

a vertically elongate rod projecting through the aligned openings in said mounting flanges for confining rounded corners of said horizontal rods between said elongate mounting rod and the inner surface of said bumper, said elongate rod having upper and lower ends which respectively project upwardly beyond and downwardly below the respective uppermost upper mounting flange and the lowermost lower mounting flange, and means fixedly associated with the projecting upper end of said mounting rod for engaging the uppermost upper mounting flange to retain the mounting rod in position.

4,883,282

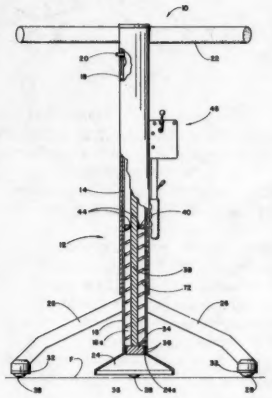
APPARATUS FOR SUPPORTING THE HANDICAPPED OR ELDERLY

Isobel T. Wolf, Rte. 3, Box 540, Dunn, N.C. 28334, and Clifton Baldwin, 4493 Chisolm Rd., John's Island, S.C. 29455

Filed Mar. 7, 1988, Ser. No. 165,178

Int. Cl.[4] B62B *7/08*

U.S. Cl. 280—43.24 **14 Claims**



1. A dressing aid for assisting in the support of an elderly or handicapped individual while that individual is being dressed, comprising:

(a) an elongated upright frame structure having upper and lower portions;

(b) grasping means mounted about the upper end portion of the upright frame structure for supporting an individual, such as an elderly or handicapped person, while the individual grasps and holds on to the same, the grasping means including a handle secured to the upper end portion;

(c) stabilizing means formed about the lower portion of the frame structure for stabilizing the same;

(d) a suction cup mounted to the lower portion of the frame structure and being movable between a position engaged with the underlying floor and a position spaced above the underlying floor;

(e) means for selectively creating a vacuum within the suction cup when the same is engaged with the floor such that the suction cup anchors the entire dressing aid to the floor in order that the individual may rest and support themself thereon while being dressed;

(f) the means for creating the vacuum further including means for automatically releasing the vacuum within the suction cup in order that the dressing aid can be moved from one location to another and

(g) retractable wheel means associated with the stabilizing means for moving between extended and retracted positions such that when a vacuum is created in the suction cup and the suction cup is engaged with the floor, the retractable wheel means may assume a retracted position while the stabilizing means engages the floor and stabilizes the upright frame structure.

4,883,283

IMPROVED HITCH AND SUSPENSION FOR ONE-WHEEL CYCLE TRAILERS

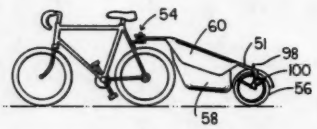
S. Richard Hazelett, P.O. Box 8, Colchester, Vt. 05446; Bernhard Bender, Essen-Heidhausen, Fed. Rep. of Germany, and John V. Savage, Hinesburg, Vt., assignors to S. Richard Hazelett, Colchester, Vt.

Filed Jul. 1, 1988, Ser. No. 214,482

The portion of the term of this patent subsequent to Nov. 8, 1990, has been disclaimed.

Int. Cl.[4] B62D *63/08*

U.S. Cl. 280—204 **3 Claims**



1. For use in conjunction with a one-wheel trailer having a normal upright position and adapted to be pulled by the frame of a "cycle," such as a bicycle, motorcycle or moped, universal-joint trailer hitch apparatus comprising:

a trailer frame for said one-wheel trailer having a transverse elongated frame member with a cylindrical rounded surface,

said elongated frame member extending horizontally transverse to the length of said one-wheel trailer when said trailer is in said normal upright position,

mounting means including attachment means for attaching said mounting means to the frame of the cycle for pulling the one-wheel trailer,

upper and lower wafer-like annular sector bearing elements positioned one above the other in spaced parallel relationship,

each of said sector bearing elements having a plurality of radially extending cylindrical concave bearing surfaces in juxtaposition with each other,

said upper sector bearing element being positioned above said elongated frame member with the concave bearing surface thereof engaged down against the cylindrical rounded surface of said elongated frame member,

said lower sector bearing element being positioned below said elongated frame member with the concave bearing surface thereof engaged up against the cylindrical rounded surface of said elongated frame member being journaled between the respective concave bearing surfaces of said upper and lower sector bearing elements for providing a transverse pivot axis,

said upper sector bearing element having an upwardly projecting centrally located trunnion with an upwardly facing thrust surface encircling said trunnion,

said lower sector bearing element having a downwardly projecting centrally located trunnion with a downwardly facing thrust surface encircling said latter trunnion,

said two trunnions being aligned for defining a vertical pivot axis, said mounting means having a hole for receiving the trunnion of said lower sector bearing element and having a surface complementary with the thrust surface which encircles said lower sector trunnion for engaging against said thrust surface,

a cap plate having a hole for receiving the trunnion of said upper sector bearing element and having a surface complementary with the the thrust surface which encircles said hinge means pivotally connecting one end of said cap plate to said mounting means, and

clamping means for urging the other end of said cap plate toward said mounting means.

4,883,284

POSITION DETECTING DEVICE FOR A MOTORCYCLE SIDE STAND

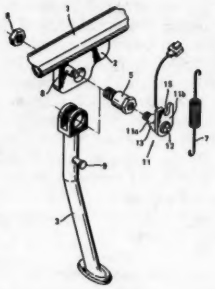
Yoshihiro Nakazawa; Masayuki Kudou; Satoshi Iijima; Katsuiki Sanada, and Yoshihiro Matsuo, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 4, 1988, Ser. No. 267,267

Claims priority, application Japan, Dec. 25, 1987, 62-331582

Int. Cl.[4] G62H *1/02*

U.S. Cl. 280—293 **23 Claims**



1. A position detecting switch for use with a vehicle side stand mechanism that includes a mounting bracket attached to the frame of said vehicle and a side stand bar mounted on said bracket by a pivot for pivotal movement between a projecting position and a receiving position, said switch comprising:

stationary contact means fixed with respect to said mounting bracket; and

movable contact means concentrically engageable with said stationary contact means and being movable coincident with said pivotal movements of said side stand bar.

4,883,285

REMOVABLE TRAILER HITCH

Harlan W. Hohrman, HCR 32, Box 74, Fort Pierre, S. Dak. 57532

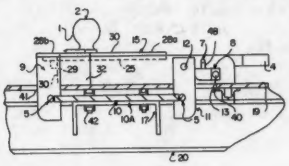
Filed Dec. 27, 1988, Ser. No. 289,814

Int. Cl.[4] B60D *1/06*

U.S. Cl. 280—491.5 **15 Claims**

1. A trailer hitch adapted to be removably mounted on the bed of a towing vehicle that has a mounting member mounted to the vehicle frame beneath the bed with the mounting member front and rear transverse end portions beneath longitudi-

nally spaced front and rear latch members slots that extend vertically through the bed, comprising a hitch frame having a front end, an intermediate and a rear end portion, a rear latch member fixed to the hitch frame rear end portion to extend a substantial distance below the hitch frame, the rear latch member being adapted to extend downwardly through the rear slot and having a forwardly opening notch for receiving the mounting member rear end portion therein, a front latch member adapted to extend downwardly through the front slot and



being movable in the front slot between a release position and a latching position to latchingly engage the mounting member front end portion, the front latch member having a rearwardly opening notch for receiving the mounting member therein when the front member is in its latching position and being spaced from the mounting member when the front latch member is in its release position, and first means for movably mounting the front latch member on the hitch frame adjacent to the hitch frame front end portion and selectively moving the front latch member between its positions.

4,883,286

TOE PIECE FOR SAFETY SKI BINDING

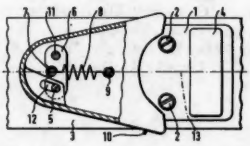
Heinz Hornschemeyer, Oberammergau, Fed. Rep. of Germany, assignor to Marker Deutschland GmbH, Eschenlohe, Fed. Rep. of Germany

Filed Aug. 2, 1988, Ser. No. 227,147

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1987, 3725709

Int. Cl.[4] A63C *9/085*

U.S. Cl. 280—629 **7 Claims**



1. A toe piece for holding a ski boot in a safety ski binding wherein said toe piece is pivotable laterally against a biasing force when excessive side forces occur, said toe piece comprising:

a base plate mountable to the upper surface of a ski;

a first pivot pin mounted to said base plate, said first pivot pin being disposed to one side of the longitudinal axis of said ski and being perpendicular to the surface thereof;

holding means for holding the sole of said boot, said holding means including an elongated, arcuate opening for receiving one end of said first pivot pin therein,

a second pivot pin mounted to said holding means for movement therewith, said second pin being parallel to said first pin and disposed on the other side of said longitudinal axis;

a generally elongated link member pivotally mounted at one end to said first pivot pin and pivotally mounted at the other end to said second pivot pin, said link member extending generally transversely to said longitudinal axis; wherein said soleholder is symmetrically disposed with respect to said longitudinal axis; and

a stop member fixed to said base plate disposed along the longitudinal axis of said ski operable to cause said soleholder to pivot about said first pivot pin when said boot exerts an outward force toward said one side of said ski, and to pivot about said second pivot pin when said boot exerts an outward force toward said other side of said ski.

4,883,287

DOUBLE LINK TYPE SUSPENSION SYSTEM WITH STABILIZER BAR

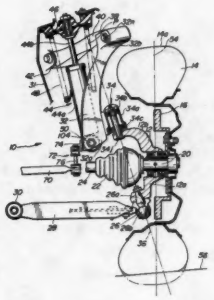
Takuya Murakami, Atsugi; Yoichiro Kato, and Kenji Terauchi, both of Zama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 18, 1988, Ser. No. 259,193

Claims priority, application Japan, Oct. 19, 1987, 62-159811[U]; Oct. 19, 1987, 63-159812[U]

Int. Cl.[4] B60G *15/00*

U.S. Cl. 280—665 **39 Claims**



1. A double link type suspension system for a vehicle, comprising:

a knuckle for rotatably supporting a wheel of the vehicle;

a lower control arm for swingably connecting a lower section of said knuckle and side of a vehicle body, said lower control arm being movably connected through a first joint to the knuckle lower section;

an upper control arm movably connected to the side of the vehicle body;

an extension member for movably connecting an upper section of said knuckle and said upper control arm, said extension member being jointed to the knuckle upper section to be rotatable around an axis line passing through said first joint; and

a stabilizer bar having an end section which is connected to said extension member at a position inside said axis line relative to the vehicle body.

4,883,288

SUSPENSION STRUT WITH SIDE LOAD SUPPORT

Bernard J. Finn, Traverse City, and Gene R. Hawkins, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

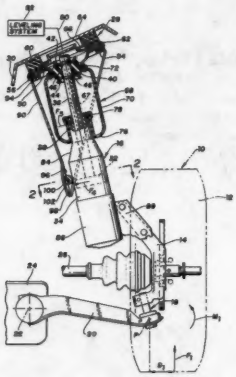
Filed Oct. 20, 1988, Ser. No. 260,338

Int. Cl.[4] B60G *3/06, 11/62*

U.S. Cl. 280—672 **5 Claims**

1. A suspension for an automotive vehicle comprising a suspension strut for mounting a road wheel assembly to body structure in the vehicle, said strut having an elongated housing containing a damping medium attached at one end to said road wheel assembly, suspension spring means associated with said housing for the spring suspension support of said body structure relative to the road wheel assembly, piston means operatively mounted for reciprocating movement within said hous-

ing strut to control the action of said suspension spring means during operation of the vehicle along a support surface, said piston means mounted for reciprocating movement in said housing and through said medium, a rod guide supported by said housing, a piston rod operatively connected to said piston means and extending from said piston means through said rod



guide into connection with said body structure, a bracket attached to said vehicle body extending along said housing and rolling spring means between said bracket and said housing for applying a side load to said housing for effectively neutralizing side loads on said rod guide and piston means from the support of said road wheel by said strut.

4,883,289

AXLE ASSEMBLY FOR A MOTOR VEHICLE

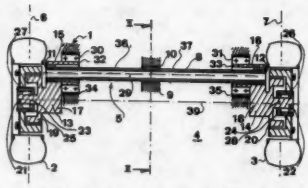
Max A. Sardou, Arpajon, France, assignor to Thor S.A., Saint-Soupplets, France

Filed Oct. 5, 1988, Ser. No. 253,466

Claims priority, application France, Dec. 17, 1987, 87 17625; Jan. 27, 1988, 87 00912; Oct. 5, 1988, 87 13709

Int. Cl.[4] B60G *11/20;* B60B *37/10;* F16F *1/16*

U.S. Cl. 280—684 29 Claims



1. An axle assembly for a vehicle including a chassis, at least two wheels suitable for contacting the ground, means for associating said two wheels with said chassis and for holding them in two substantially parallel planes, said means comprising a unit beam, having opposite ends, means for preventing a point situated substantially between the two ends of the beam from rotating relative to said chassis, two arms, means for fixing each arm substantially at one of its ends to a respective one of the two ends of the beam, and means for rotatably mounting respective ones of said two wheels to the opposite ends of said arms, wherein two portions of the beam situated on respective sides of said point are made of a material such that each of them has anisotropic torsion elasticity in the opposite direction.

4,883,290

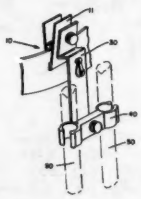
SKI POLE CARRIER

Kevin Landa, 769 Georgia Ave., Reading, Pa. 19605

Filed Feb. 15, 1989, Ser. No. 311,476

Int. Cl.[4] A63C *11/00*

U.S. Cl. 280—814 8 Claims



1. A carrier for carrying ski poles on the person comprising

(a) clip means for attachment to the person;

(b) clamp means for holding a pair of ski poles snugly in the carrier;

(c) rotation means attached to the clamp means to alter rotationally the longitudinal axis of the ski poles relative to the person when held in the carrier;

(d) offset bracket means between the clip means and clamp means for offsetting the poles from the person.

4,883,291

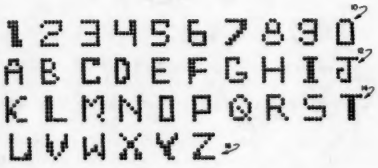
DOT MATRIX FORMED SECURITY FONTS

John A. Robertson, Chillicothe, Ohio, assignor to Telesis Controls Corporation, Chillicothe, Ohio

Filed May 11, 1988, Ser. No. 192,842

Int. Cl.[4] B42D *15/00*

U.S. Cl. 283—117 30 Claims



1. The combination of an article of manufacture having a surface bearing identifying characters of an alphabetical and numerical set produced in a form adapted to be recognized by human vision in accordance with their shapes and orientations, said characters being formed of character shape defining pixels selected from a predetermined available constant matrix having a predetermined number of rows of pixel positions extending from a top row to a bottom row, wherein each character is formed as a unique combination of a predetermined constant and equal number of said pixels.

4,883,292

CORROSION RESISTING STEEL PIPE AND METHOD OF MANUFACTURING SAME

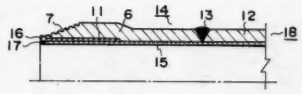
Takanori Kuroki, Munakata, Japan, assignor to Kuroki Kogyosho Co., Ltd., Fukuoka, Japan

Continuation of Ser. No. 140,929, Dec. 22, 1987, abandoned, which is a continuation of Ser. No. 689,995, Jan. 9, 1985, abandoned. This application Feb. 10, 1989, Ser. No. 310,003

Claims priority, application Japan, Jan. 20, 1984, 59-7256; Apr. 18, 1984, 59-76664

Int. Cl.[4] F16L *9/14*

U.S. Cl. 285—55 **4 Claims**



1. A corrosion resisting steel pipe comprising an outer steel pipe member lined with an inner liner of a corrosion resisting material, characterized in that said steel pipe has a unit length and consists of an outer steel pipe member and an inner pipe member made of titanium metal;

said outer steel pipe member consisting of an end tube and a general tube joined to said end tube;

said inner pipe member comprising a short tube of titanium metal pipe member metallurgically bonded inside of an end portion of said end tube and a long tube of titanium metal pipe member metallurgically joined by heat welding to an end portion of an inside portion of said short tube;

wherein said short tube of titanium metal is fitter closely outside of a portion of said long tube of said titanium metal pipe member.

4,883,293

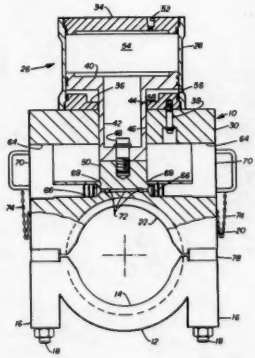
CLAMP CONNECTOR

John E. Lawson, Woking, England, assignor to Cameron Iron Works USA, Inc., Houston, Tex.

Filed Sep. 27, 1988, Ser. No. 249,730

Int. Cl.[4] F16L *21/06*

U.S. Cl. 285—364 **1 Claim**



1. A connector clamp for connecting and securing flanges on abutting ends of tubular members together in sealing relationship comprising

a first arcuate clamping member having opposed annular lips for engaging flanges of abutting tubular members,

a second arcuate clamping member having opposed annular lips for engaging the flanges of abutting tubular members,

a pressure responsive actuator,

said actuator including

a first portion connected to one of said clamping members,

a second portion connected to a plate,

tension members connecting said pressure responsive actuator to one of said arcuate clamping members,

said plate having said tension members secured thereto,

actuation of said pressure responsive actuator in one direction moving said clamping members into tight clamping engagement with the flanges of the abutting tubular members and to preload said tension members,

means coacting with said pressure responsive actuator and said clamping members to maintain said tension members under the desired preload condition independent of the pressure on said actuator,

actuation of said actuator to close said clamping members moving said first portion into spaced relationship from said plate,

said coacting means being sized to be positioned in the space between said plate and said one of said clamping members,

opposed openings in said one of said clamping members,

means for supplying fluid under pressure to said opposed openings, and

a piston on each of said coacting means sized for sliding and sealing position within said openings when installed to maintain the preset tension load in said tension members.

4,883,294

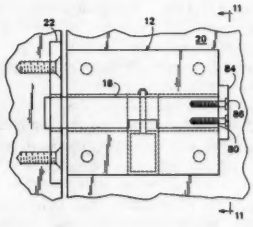
TAMPER-PROOF LOCKING DEVICE

Byron L. Goodspeed, 1111 Holcomb Rd., Kelso, Wash. 98626

Filed May 16, 1988, Ser. No. 194,333

Int. Cl.[4] E05C *1/04*

U.S. Cl. 292—148 **4 Claims**



1. A device used in connection with a padlock having a body and a shackle wherein the shackle may be brought into locking engagement with the body, the device being adapted to lock a movable element against movement relative to a stationary element, the device comprising:

an elongate deadbolt adapted to fit within the shackle of the padlock such that the deadbolt may translate along its longitudinal axis with respect to the padlock when the shackle is not in locking engagement with the body and is held substantially stationary with respect to the padlock when the shackle is in locking engagement with the body;

a keeper adapted to slibably receive the deadbolt;

a base plate having mounting holes therethrough;

a top plate having threaded holes extending partially therethrough; and

bolts positionable through at least one of said movable and stationary elements and through the mounting holes for threaded engagement with the threaded holes,

wherein at least one of said base plate and said top plate includes a first channel defining a first pathway adapted to slidably support said deadbolt to allow said deadbolt to translate along its longitudinal axis therein and includes a second channel defining a second pathway which intersects the first pathway and is adapted to receive the pad-

lock while restricting motion of the padlock in directions parallel to the longitudinal axis of said deadbolt.

4,883,295

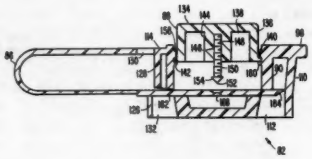
TAMPER DETERRENT ASSEMBLY

David A. Kesselman, 5494 Winter Creek Rd., Santa Rosa, Calif. 95404

Continuation-in-part of Ser. No. 773,079, Sep. 6, 1985, Pat. No. 4,699,408. This application Oct. 9, 1987, Ser. No. 106,360

Int. Cl.[4] B65D *27/30*

U.S. Cl. 292—307 R **22 Claims**



1. A tamper deterrent assembly comprising:

a body member having wall means defining a locking space which is enclosed except for an open end thereof, first and second strip receiving means formed on said wall means in opposed relationship on opposite sides of said locking space and in spaced relationship to the open end of said locking space, at least said first strip receiving means being formed by a slot which extends through said wall means to provide an opening to said locking space,

a closure means having a locking strip engagement means projecting outwardly therefrom;

mounting means formed on said body member for retaining said closure means within said locking space and releasably retaining said closure means in a first position wherein said locking strip engagement means is spaced from said first and second strip receiving means in the direction of the open end of said locking space, said closure means being operative to prevent access to said locking space through the open end thereof and being movable from said first position relative to said wall means into said locking space in the direction of said first and second strip receiving means in response to pressure applied to said closure means sufficient to release said closure means from said mounting means, said closure means being freely movable to a locking position after said release, and

an elongated locking strip including a first portion of a length greater than the distance across said locking space between said first and second strip receiving means, said first portion being formed for insertion into the slot forming said first strip receiving means so as to extend across said locking space to said second strip receiving means and including receiver means operative to receive said locking strip engagement means when the first portion of said elongated locking strip is inserted through the slot forming said first strip receiving means and extends across said locking space into said second strip receiving means and said closure means is moved from said first position to move said locking strip engagement means past said first and second strip receiving means to a locking position, said closure means being positioned in said locking space completely within the confines of said wall means when said locking strip engagement means is in the locking position.

4,883,296

HANDLE ASSEMBLY

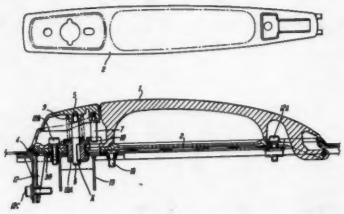
Stephen A. Laurie, Crewe, England, assignor to Rolls-Royce Motor Cars Limited, Crewe, England

Filed Jan. 25, 1988, Ser. No. 148,019

Claims priority, application United Kingdom, Jan. 28, 1987, 8701875

Int. Cl.[4] E05C *21/00*

U.S. Cl. 292—336.3 **10 Claims**



1. A handle assembly for a closure member comprising a handle having a portion mounted to be resiliently moved in relation to the remainder of the handle between a first inoperative position and a second operative position in which a closure member to which the handle is attached may be opened, and means for connecting the handle assembly to the closure member, from externally of the closure member, access to said means being prevented by the handle when the handle is so connected, said means for connecting including a restrain preventing removal of the portion of said restraint being accessible only when the closure member is in an open position; release of said restraint permitting access for further manipulating of said means for connecting.

4,883,297

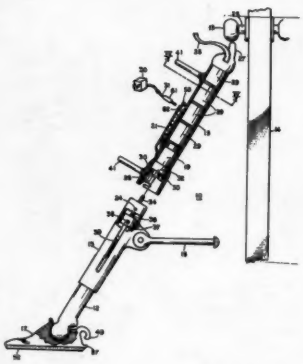
POWER OPERATED DOOR GUARD

Daniel R. Smith, 32 W. Anapamu St., #351, Santa Barbara, Calif. 93101

Filed Sep. 30, 1988, Ser. No. 251,316

Int. Cl.[4] E05C *19/18*

U.S. Cl. 292—339 **10 Claims**



1. A security brace for doors having doorknobs or the like for rooms having floors comprising:

(a) a telescoping brace having relatively moveable parts;

(b) means attached to one end of the brace for holding the brace to a doorknob;

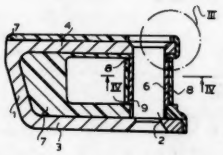
(c) a foot attached to the other end of the brace for engaging a floor;
(d) thread and nut means for extending and retracting the brace;
(e) an electric motor connected to one of said thread and nut to rotate one with respect to the other;
(f) an arm extending from the brace to contact a door to hold the brace at an angle to the door.

4,883,298

BOLT ASSEMBLY FOR MOTOR-VEHICLE DOOR LATCH

Frank Kleefeldt, Heiligenhaus, Fed. Rep. of Germany, assignor to Kiekert GmbH & Co. Kommanditgesellschaft, Heiligenhaus, Fed. Rep. of Germany

Division of Ser. No. 203,245, Jun. 6, 1988, Pat. No. 4,834,435. This application Oct. 31, 1988, Ser. No. 265,492
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 8710288[U]
The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.
Int. Cl.[4] E05C *21/00*
U.S. Cl. 292—341.12 **1 Claim**



1. A bolt assembly for a motor-vehicle latch wherein the assembly is secured to a doorpost and coacts with a latch fork, the assembly comprising:
a metallic U-shaped yoke having an inner flange adapted to be secured to the doorpost and an outer flange spaced therefrom, forming a fork-receiving space therewith, and having an outer surface turned away from the inner flange;
a metallic bolt fixed to the two flanges and extending generally perpendicularly therebetween;
a nonmetallic resilient sleeve surrounding the bolt between the flanges;
a nonmetallic cover overlying at least the outer surface of the outer flange; and
a second sleeve surrounding the first-mentioned sleeve and of a material substantially more resistant to wear than the first sleeve; the cover being molded on the yoke, and forming a separate element complementarily fitted to the yoke.

4,883,299

BUMPER

George D. Bonar, 333 Bowery, New York, N.Y. 10003

Filed Apr. 7, 1988, Ser. No. 178,540
Int. Cl.[4] B60R *19/10*
U.S. Cl. 293—110 **4 Claims**

1. A cushioned bumper for a vehicle, comprising a plurality of resilient inflated members attached to the outer portion of a conventional vehicle bumper, said inflated members having interconnecting valves therebetween to equalize pressures in

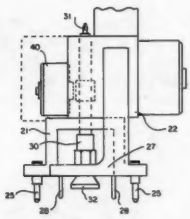
all members upon impact of one or more members with another vehicle or other object.

4,883,300

END EFFECTOR FOR IC CHIP HANDLING

Minoru Akagawa, Fremont, Calif., assignor to Intelmatec Corporation, Fremont, Calif.

Filed Oct. 13, 1988, Ser. No. 257,324
Int. Cl.[4] H05K *13/00*
U.S. Cl. 294—2 **2 Claims**



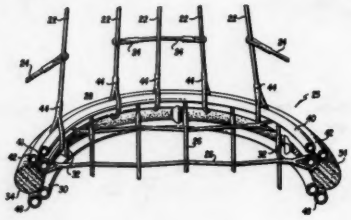
1. An end effector for automatically removing an IC chip from a frame-like holder therefor provided with holes at specified positions and a plurality of tongue-like protruding pieces extending in specified parallel direction and normally in contact with said IC chip to together securely support said IC chip with respect to said holder but elastically bendable away from said IC chip, said end effector comprising
downward protruding locating pins which fit said holes to thereby correctly position said end effector with respect to said holder,
a pair of pincer-like grippers, a plurality of downward shoving pins protruding downwardly from said grippers so as to be able, when said locating pins are inserted into said holes, to press and thereby bend said tongue-like protruding pieces to release said IC chip from said tongue-like protruding pieces,
a tubular member disposed substantially vertically, a lower end thereof being directly above said IC chip when said locating pins are inserted into said holes, and an upper end thereof being connectable to vacuum pump means for providing suction at said lower end,
gripper moving means for moving said grippers horizontally and linearly towards or away from each other, and
tube moving means for vertically moving said tubular member up and down.

4,883,301

CUSHION FOR A PERSONNEL/CARGO NET

Billy G. Pugh, Corpus Christi, Tex., assignor to Billy Pugh Company, Inc., Corpus Christi, Tex.

Filed Aug. 1, 1988, Ser. No. 226,884
Int. Cl.[4] B66C *1/16*
U.S. Cl. 294—77 7 Claims



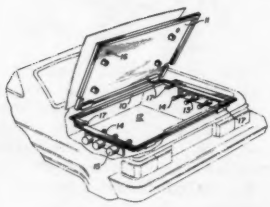
1. In a personnel/cargo net having at least one spreader ring, and said at least one spreader ring is a base spreader ring comprising top and bottom rings secured together in a vertically spaced relationship, and a buoyant pad surrounding each of said top and bottom rings, wherein the improvement comprises, at least one separate fluid-containing shock absorbing means for absorbing landing-or collision-shock experienced by the base spreader ring, and being located above said buoyant pad.

4,883,302

CAR TRUNK SECURITY DOOR

Andrew H. McCain, 170 N.E. 163rd St., N. Miami Beach, Fla. 33162

Filed Mar. 15, 1988, Ser. No. 168,240
Claims priority, application United Kingdom, Mar. 3, 1987, 8704976
Int. Cl.[4] B60R *5/04*
U.S. Cl. 296—37.1 4 Claims



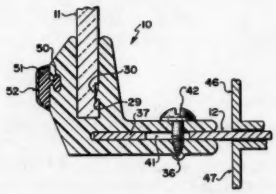
1. A demountable security door system for a car trunk comprising a frame with an opening and longitudinal ends, said frame being substantially two dimensional and mountable within said car trunk with a trunk opening, bottom wall, and sidewalls at opposite lateral ends of said trunk, a door attachable to said frame and constructed and arranged with buttresses to cover said frame opening, frame fastening means comprising a plurality of rods of adjustable lengths extending longitudinally of said frame and rotatably secured to each end of said frame for adjusting the length of said rods, said frame spaced from said trunk's bottom wall with pivoting, swiveling foot pads fastened to the distal ends of each of said rods for self alignment of said pads against said sidewalls of said car trunk and to distribute outward stress caused by extending the rods against said side walls to hold said frame at any position of height securely within said trunk below a lid for said car trunk.

4,883,303

DEFLECTOR SCREEN FOR MOTOR VEHICLE

Edward J. Gross, Ile de Chenes, Canada, assignor to Sundawn Inc., Winnipeg, Canada

Filed Jun. 16, 1987, Ser. No. 62,835
Int. Cl.[4] B60J *1/20*
U.S. Cl. 296—91 13 Claims



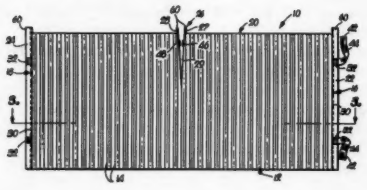
1. A deflector screen apparatus for attachment adjacent the front of the hood of a motor vehicle comprising an extruded strip member and defining a generally upstanding front surface, a channel portion rearwardly of the front surface defining a substantially vertical channel extending longitudinally along the strip member, a pane of screen material mounted in said channel and extending upwardly therefrom, an attachment portion extending rearwardly from said channel portion for receiving mounting means by which the strip member can be attached to the vehicle, said attachment portion comprising a pair of parallel flanges extending rearwardly from said channel portion and defining therebetween a substantially horizontal channel receiving a plate member therein, wherein an upper one of said flanges includes a groove in an upper surface thereof extending longitudinally therealong, and wherein a lower one of said flanges includes a projecting rib in a lower surface thereof and lying the same vertical plane as the groove whereby a screw can be screwed into said upper flange at said groove, through said horizontal channel and into said rib to maintain said plate member in said channel.

4,883,304

VEHICULAR WINDOW SUN SHIELD

Everett E. Elliott, 825 S. 5th St., Atchison, Kans. 66002

Filed May 31, 1988, Ser. No. 200,760
Int. Cl.[4] B60J *3/02*
U.S. Cl. 296—97.8 2 Claims



1. A sun shade for a windshield of a vehicle, wherein said vehicle includes side wall sections extending along lateral edges of said windshield and wherein said vehicle includes a rear view mirror and a mounting post connecting said mirror to said windshield, said shade comprising:

a collapsible panel comprised of a flexible membrane having a plurality of pleats for collapse of said panel along a longitudinal axis, said pleats extending transversely to said longitudinal axis,

said panel presenting a pair of opposed, lateral marginal edge portions and a normally upper central portion extending

longitudinally intermediate said lateral marginal edge portion when said panel is in an extended orientation,

said upper central portion including a transversely extending channel for receiving said mounting post when said shade is installed with said longitudinally extending axis in a generally horizontal orientation, said opposed lateral marginal edge portions positioned adjacent said side walls and said upper central portion positioned adjacent said post;

means for releasably securing each of said marginal edge portions of said panel to a respective one of said wall sections of the vehicle; and

stiffener structure including three elongated, flexible elements for supporting said panel in an extended orientation adjacent said windshield,

two of said three elements being connected to respective ones of said marginal edge portions of said panel and extending generally parallel to said pleats along said respective edge portions,

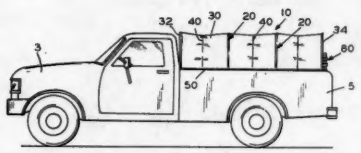
the remaining stiffener element being secured to said panel and extending along at least one side of said channel for reinforcing said panel in the vicinity of said mirror, said remaining stiffener element including two upper, separable portions joined at lower ends; and including means for releasably coupling together said upper separable portions at a location above the mirror post.

4,883,305

COLLAPSIBLE CANOPY FOR PICKUP TRUCKS

Paul F. Horton, 9393 Hackamore Dr., Boise, Id. 83709

Filed Feb. 6, 1989, Ser. No. 306,040
Int. Cl.[4] B60J *7/24*
U.S. Cl. 296—105 **16 Claims**



1. A collapsible canopy for a vehicle with cargo bed comprising:

elongated guide means positioned along each side of the cargo bed;

a plurality of slide members mounted within said guide means for reciprocal movement therein;

a plurality of rigid canopy stays; each of said stays substantially arch-shaped in construction having a pair of laterally spaced and upright leg members and a transverse member supported by said legs; each of said leg members attached to a respective slide for reciprocal movement along said guide means;

a flexible fabric cover engaging said rigid stays to define an arch-like covering for the bed when in the extended canopy mode;

a plurality of elastic bands, each of said elastic bands engaging said fabric cover between and in parallel relationship with said rigid stays for drawing said rigid stays into close apposition with one another in the collapsed canopy mode and to maintain a taut cover in the extended canopy mode; and

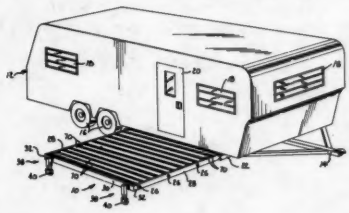
latch means for holding said rigid stays in a spaced, front to rear relationship, when in the extended canopy mode.

4,883,306

DECK FOR MOBILE HOMES

Michael E. Stucky, Attica, Kans., assignor to E Z Dek, Inc., Fort Scott, Kans.

Filed Sep. 9, 1987, Ser. No. 94,516
Int. Cl.[4] B60R *15/00*
U.S. Cl. 296—162 **10 Claims**



1. A deck for attachment to the underside of a mobile home, said deck comprising:

a platform presenting a generally horizontal deck surface and having a leading edge; and

means for mounting said platform on the underside of the mobile home in a manner permitting the platform to move between a retracted position wherein the platform is substantially beneath the underside of the mobile home and an extended position wherein the platform extends laterally from the mobile home with said leading end spaced away from same, said platform comprising a plurality of wooden deck planks; and

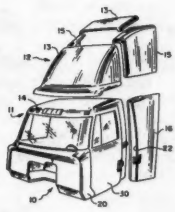
a rigid frame presenting thereon a plurality of parallel channels each open at the top and each having a size and shape to receive and retain one of the deck planks therein with the planks cooperating to provide a substantially continuous and generally horizontal deck surface.

4,883,307

REAR QUARTER PANEL FORMING INTEGRAL CAB EXTENDER

Jay P. Hacker, Fort Wayne, Ind., and Rodney A. Laukhuf, Haviland, Ohio, assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Jun. 10, 1988, Ser. No. 204,822
Int. Cl.[4] B62D *35/00*
U.S. Cl. 296—180.2 **11 Claims**



1. In combination with a cab of a tractor-trailer, a cab side extender for reduction of air drag, said cab extender comprising a unitary structure attached to said cab and comprising a rear-quarter-panel-forming portion including a rear wall, a side wall and a front wall, the side wall and rear wall of said rear-quarter-panel-forming portion forming an integral aerodynamic fairing, the side wall having a rearwardly and laterally outwardly flared sidewall-forming surface and the rear wall having a rearwardly laterally outwardly flared rear-wall-form-

ing surface which extends from a vertical mounting surface engaging the cab and converges with a rear end edge of said sidewall-forming surface to form the fairing.

4,883,308

SINGLE SEATER MOTOR VEHICLE

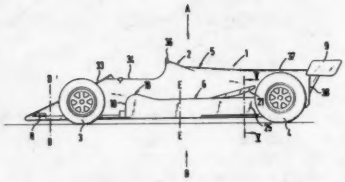
Norbert Singer, Vaihingen, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche AG, Stuttgart, Fed. Rep. of Germany

Filed Sep. 1, 1988, Ser. No. 239,397

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729558

Int. Cl.[4] B60R *27/00*

U.S. Cl. 296—185 **20 Claims**



1. A single seater motor vehicle with essentially freely exposed wheels, comprising a streamlined body extending in the vehicle longitudinal direction and resembling an aircraft body, the streamlined body including a base body means of a cross section at least shapewise approximately in the shape of a door arch and having negative lift surface means extending transversely to the vehicle longitudinal direction provided in the front and rear and lateral body means of approximately rectangular cross section, the lateral body means being provided adjacent the front wheels with inlet openings for radiators of an internal combustion engine, the internal combustion engine being arranged covered by the base body means between the front wheels and rear wheels but more adjacent the rear wheels, the base body means having—as viewed in top plan view—a configuration tapering toward the front and rear in such a manner that it has its greatest width in a cross plane between the wheel axes but adjacent the rear wheels, the base body means having—as viewed in bottom plan view—a configuration tapering toward the front and rear in such a manner that it has its largest width in a cross plane within the area of the front wheels, the base body means including at its bottom side a boundary wall that extends substantially parallel to the road surface over a considerable partial area of this bottom side, the lateral body means being provided at their bottom sides adjacent the front wheels with concave guide sections which extend away from substantially horizontal boundary wall means, the boundary wall means being continued at the bottom side of the lateral body means to the rear of the guide sections, on the one hand, horizontally up to the rear wheels and, on the other, being continued as through-flow channels, the through-flow channels rising from the boundary wall means and extending inside of the rear wheels, and the lateral body means being constructed in the manner of a wing profile above the inlet openings.

4,883,309

FRONT STRUCTURE FOR MODULAR VEHICLE BODY

Kenichi Miyazaki, Sagamihara; Katsumi Nakamura, Fujisawa, and Taro Hagiwara, Sagamihara, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Apr. 29, 1988, Ser. No. 188,507

Claims priority, application Japan, Apr. 30, 1987, 62-107387

Int. Cl.[4] B62D *25/00*

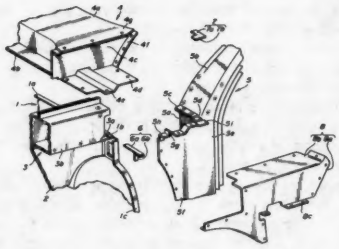
U.S. Cl. 296—194 **15 Claims**

1. A front structure for a modular vehicle comprising:

a dash lower panel having at the upper end thereof a first horizontal flange, said first horizontal flange having a first recess at an end thereof;

a front pillar having at a front waist portion thereof a second horizontal flange, said second horizontal flange having a second recess at an end thereof;

a patch plate extending between said first and second flanges and cooperating with same to form a smooth continuous joining surface, said patch plate being disposed in said first



and second recesses so that an outer surface of said plate is substantially flush with adjacent outer surfaces of said first and second flanges;

sealant adhesive applied to said joining surface; and

a cowl box having a cowl side panel and a side portion projecting outwardly from said cowl side panel, said side portion being laid upon said joining surface and secured to same by interposing therebetween said sealant adhesive.

4,883,310

ROOF STRUCTURE FOR MODULAR VEHICLE BODY

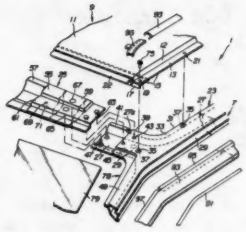
Kenichi Miyazaki, Sagamihara, and Tadahiko Morigaki, Hatano, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Mar. 25, 1988, Ser. No. 173,402

Claims priority, application Japan, Mar. 26, 1987, 62-70484

Int. Cl.[4] B60D *25/06*

U.S. Cl. 296—210 **13 Claims**



1. A roof structure for a vehicle body comprising:

roof rail means having a plurality of joining surfaces which are nearly flush with and extend consecutively from each other;

a sealant adhesive applied to said joining surfaces of said roof rail means;

a roof assembly having at the periphery thereof a joining surface lapped on said joining surface of said roof rail means with said sealant adhesive being interposed therebetween; and

mechanical fastening means for mechanically fastening said joining surface of said roof assembly to said joining surfaces of said roof rail means;

wherein said roof assembly includes a roof panel with a front end, said roof assembly further having a moulding secured

to said front end of said roof panel to cover an upper end portion of a windshield glass.

4,883,311

SLIDING AND LIFTING ROOF FOR VEHICLES

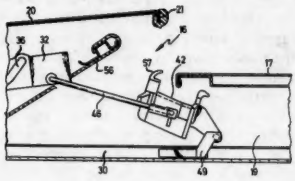
Georg Kohlpaintner, Martinsried, and Horst Bienert, Gauting, both of Fed. Rep. of Germany, assignors to Webasto AG Fahrzeugtechnik, Gauting, Fed. Rep. of Germany

Filed Nov. 28, 1988, Ser. No. 276,660

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1987, 3740129

Int. Cl.[4] B60J *7/05*

U.S. Cl. 296—213 **20 Claims**



1. A sliding and lifting roof for vehicles of the type having a rigid cover mounted on guide tracks extending parallel to side edges of a roof opening formed in a fixed roof surface, said cover, in a closed position, closing said roof opening, being selectively raisable, at a rear edge thereof, above the fixed roof surface, and being slidably displaceable, by lowering of its rear edge, below the fixed roof surface; said roof further having a displaceable rain gutter which underlies the rear edge of the roof opening when the cover is raised or closed, the rain gutter being connected with a tilt assembly in a manner causing the rain gutter to assume an inclined position, in which a forward edge thereof is elevated, when the cover is raised, said tilt assembly having control levers, at each side of the roof opening, a rearward end area of said control levers being fixedly connected with the rain gutter and a forward end area of the control levers being pivotably attached to the cover at a fixed pivot point which is closer to the rear edge of the cover than the forward edge of the cover; wherein the rain gutter is pivotably connected at each side of the roof opening by a sliding element that is slidably displaceable along the guide tracks and provides a pivot axis for the rain gutter which is located at a distance rearward of the rain gutter and at a fixed predetermined vertical height above the guide tracks; said position of the rain gutter pivot axis and the location of the fixed pivot points of the control levers being selected in a manner enabling a roof headliner to be connected with the cover by being slid below the rain gutter from a position disposed rearwardly of the rain gutter.

4,883,312

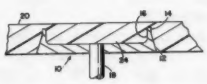
PANEL IN-PART LOCATORS

Lawrence J. Kulis, Sterling Heights, Mich., assignor to United Technologies Automotive, Inc., Dearborn, Mich.

Continuation of Ser. No. 938,317, Dec. 5, 1986, abandoned, which is a division of Ser. No. 802,509, Nov. 26, 1985, Pat. No. 4,664,865. This application Jul. 8, 1988, Ser. No. 216,472

Int. Cl.[4] B60J *7/00;* **B32B** *3/30*

U.S. Cl. 296—214 **5 Claims**



1. A headliner panel for use with a motor vehicle and for use with an assembly process including part locators for aligning headliner panels during various process steps comprising a contoured molded panel of predetermined thickness at selected locations and configured to the dimensions of the motor vehicle, said panel defining a locator notch extending from one surface of the panel inwardly, said locator panel notch being positioned at a location having sufficient thickness that the locator notch does not extend through the panel, said notch defining a cavity fill area of panel material extending into the locator notch, and said notch serving as an opening for mating with part locators for assuring positive alignment of the panel for subsequent manufacturing operations.

4,883,313

VEHICLE SUNROOF

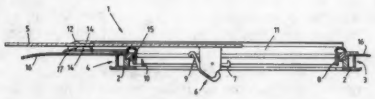
Dennis Bradley, Stafford, England, assignor to Arrowin Limited, England

Filed Aug. 16, 1988, Ser. No. 232,699

Claims priority, application United Kingdom, Feb. 10, 1988, 8803067

Int. Cl.[4] B60J *7/04*

U.S. Cl. 296—216 **7 Claims**



5. A vehicle sunroof comprising:

a frame, said frame being mountable in a roof aperture of a vehicle and having a front and a rear edge and a pair of fixed elongate side support members; and

a slidable panel, said panel being supported in said side support members of said frame, said side support members being adapted to allow rearwards sliding of said panel;

each of said side support members extending beyond said rear edge of said frame ,said side support members each having a rear opening, and wherein said panel is adapted to slide to an open position cantilevered from said rear openings.

4,883,314

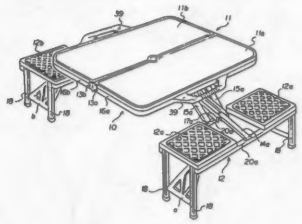
FOLDING TABLE AND SEAT ASSEMBLY

Chul H. Sakong, 11 Nowon-Dong, 3-Ka, Buk-Ku, Daegu, Rep. of Korea

Filed Apr. 15, 1988, Ser. No. 182,082

Int. Cl.[4] A47B *39/00*

U.S. Cl. 297—159 **4 Claims**



1. A folding table and seat assembly collapsible into a self-contained carrying case which comprises:

a table including two pivotally attached table top halves for opening and folding together,

seat assemblies including an inside frame portion nearer to said table and an outside frame portion further from said

table, wherein said seat assemblies are operatively connected to said table for opening up and collapsing into said table top halves, and said seat assemblies include a plurality of legs pivotally attached thereto,

table support assemblies for connecting said table to said seat assemblies, said table support assemblies each including:

a first table support member pivotally connected to said outside frame, said first table support member extending to support said table from said seat assemblies, and

a pair of second table support members pivotally connected to both sides of said first table support member and to said inside frame,

table support connecting members operatively connecting said first table support member to said seat assemblies, said table support connecting members each including:

a first connecting member pivotally connected to said inside frame, and

a second connecting member pivotally connected to said first table support member and said first connecting member, wherein said first connecting member has a bent flange and said second connecting member has a slot for receiving said bent flange,

seat support members formed in said seat assemblies and including a lower arm pivotally connected between a pair of said legs and a tubular upper arm pivotally connected to said lower arm and to said seat, said lower arm has a channel for operatively receiving said tubular upper arm,

tensible ring members having an elliptical configuration and a pair of projecting members disposed within said tubular upper arm for operatively engaging said pair of projecting members in a pair of apertures disposed in the tubular upper arm,

fixing pins mounted to said channel of the lower arm for tightly engaging in a pair of apertures disposed in the channel when the seat member is opened,

hinge plates, attached to edge portions of said table, having pivot pins for pivotally moving said table top halves in open and closed positions, said hinge plates each including a hook member for locking one hinge plate together with the other hinge plate,

handle members mounted on said table top halves, and

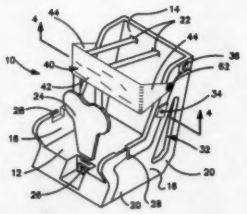
a pair of locking members slidably attached to said handle members for locking said handle members together, said locking member including a hollow member which has a pair of vertical protrusions disposed therein for locking in a pair of vertical grooves disposed in the surface of handle portions of said table, whereby the folding table and seat assembly is readily portable for hand-carrying when collapsed, stable when opened and assembled for use, and simple to manufacture.

4,883,315

VISOR APPARATUS MOUNTED ON PROTECTIVE SEAT FOR CHILDREN

James L. Ferguson, P.O. Box 853, Monument, Colo. 80132

Filed Jun. 16, 1988, Ser. No. 207,736
Int. Cl.[4] A47C 7/10
U.S. Cl. 297—184 **28 Claims**



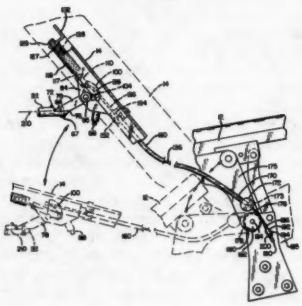
1. In a protective seat for children adapted to be secured on a seat of a vehicle by releasable restraint belts of the vehicle, said protective seat including a support shell having longitudinal length and transverse width, said support shell operative to receive and support a child during travel, a support frame positioning and supporting the support shell on a seat of the vehicle and child restraining means releasably securable about a child received by the support shell for keeping the child in the protective seat apparatus in the event of a collision, sudden stop of the vehicle and the like, said support shell having a seat portion, a back portion and lateral side edge portions, the improvement comprising a visor including a central portion and opposite end portions with each said end portion having a mounting hole and mounting means on each lateral side edge portion, each said mounting means for mounting each end portion to the protective seat apparatus and including a mounting post projecting laterally outwardly from the protective seat apparatus and a securing member releasably received and secured on the respective mounting post whereby each mounting post is matably received by a respective mounting hole so that the end portions engage the mounting post and each end portion is retained in a selected position with said central portion extending across the support shell in spaced part relation thereto so that the central portion is positioned over a child placed in said protective seat.

4,883,316

DENTAL INSTRUMENT DELIVERY SYSTEM

George K. Austin, Jr., Newberg, and Mathew H. Parlier, Sheridan, both of Oreg., assignors to A-Dec, Inc., Newberg, Oreg.

Continuation-in-part of Ser. No. 101,797, Sep. 28, 1987, abandoned. This application Sep. 20, 1988, Ser. No. 245,675
Int. Cl.[4] A47C 7/62
U.S. Cl. 297—191 **25 Claims**



1. A dental instrument delivery system for use with a dental chair having a seat and a back rest tiltable about a fixed horizontal axis, said system comprising:

retaining means pivotably attached to said back rest for movement about a second horizontal axis holding a plurality of dental instruments in an accessible position during a dental procedure;

control means connected between said retaining means and said seat for pivoting said retaining means relative to said back rest with the tilting of said back rest so as to maintain said retaining means in a predetermined relation with respect to the horizontal irrespective of the position of said back rest; and

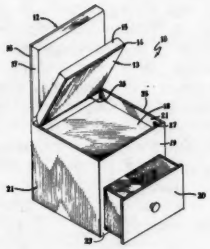
safety release means operatively connected between said control means and said back rest for enabling said retaining means to move upward relative to said back rest when said retaining means is accidentally lowered downward onto a stationary object, whereby said safety release means prevents damage to said retaining means.

4,883,317

MULTI-PURPOSE CHAIR

Lizzie B. Davenport, RR. 1, P.O. Box 278, Pine Knot, Ky. 42635

Filed Oct. 17, 1988, Ser. No. 258,805
Int. Cl.[4] A47C 7/62
U.S. Cl. 297—193 6 Claims



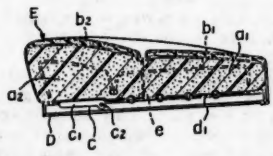
1. A multi-purpose chair, comprising, in combination:
a base means;
a seat means;
hinge means pivotally connecting the seat means and the base means;
support means provided by the base means;
the base means having support means providing that the seat means is supported between a generally horizontal seat position for providing a support seat for a person, and an upraised position spaced from the support means;
the base means being provided with a support tray supported by the base means below the seat position of the seat means, and providing article-storage of a first type below the seat means;
the base means provided with a generally upright panel means extending above the seat position of the seat means, providing a supportive back for a person seated on the seat means;
the said panel means being provided with receiver means for providing article-storage of a second type rearwardly on the back of the panel means.

4,883,318

VEHICLE SEAT

Mitsuhiro Adachi, Akishimashi, Japan, assignor to Tachikawa Spring Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 878,312, Jun. 25, 1986, abandoned.
This application Oct. 13, 1987, Ser. No. 105,995
Int. Cl.[4] A47C 3/00
U.S. Cl. 297—234 6 Claims



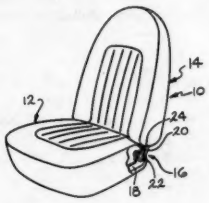
1. A vehicle seat comprising:
(a) a cushion member made of a foam material, said cushion member including a buttocks support section and a (peripheral) thigh support section, wherein both said buttock support section and said (peripheral) thigh support section are integrally formed with each other;
(b) a shape-retaining frame-like member for retaining the shape of said cushion member, said shape-retaining member being wholly embedded within said cushion member and comprising a fixed frame-like element located in said buttocks support section of said cushion member and a movable frame-like element located in said (peripheral) thigh support section of said cushion member, the lateral edges of fixed and moveable elements being bent upwardly to conform to the peripheral contour of said cushion, and said movable element being pivotally connected for rotation to said fixed element so as to be movable vertically relative thereto; and
(c) means for raising and lowering said movable frame-like element and said (peripheral) thigh support section of said cushion member therewith, said means being located at the bottom portion of said (peripheral) thigh support section, whereby said (peripheral) thigh support section can be pivotally adjusted up and down by vertical rotation with respect to said buttocks support section while maintaining a continuous sitting surface on said cushion member.

4,883,319

SELF-LOCKING SPACER BUSHING

Glenn Scott, Ann Arbor, Mich., assignor to Hoover Universal, Inc., Ann Arbor, Mich.

Filed Dec. 16, 1988, Ser. No. 285,653
Int. Cl.[4] B60N 1/02
U.S. Cl. 297—354 7 Claims

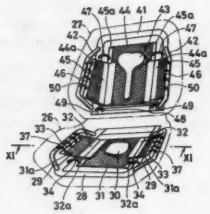


1. In a vehicle seat assembly having a generally horizontal seat frame member and a generally upright back frame member, means including a hinge pin connecting said back frame member to said seat frame member to enable pivotal movement of one frame member about a pivot axis relative to the other frame member, a bushing assembly telescoped over said hinge pin, said bushing assembly comprising:
a pair of coaxial sleeve members each having an annular portion forming a bore therethrough centered on said axis and at least one tang portion extending axially along said bore from said annular portion;
retaining means on each of said tang portions of each one of said pair of sleeve members for engaging said annular portion of the other one of said pair of sleeve members to interlock said sleeve members together; and
shoulder means on each of said annular portions engageable with said one of said frame members for maintaining said one frame member in a position between said annular portions of said sleeve members to limit relative movement of said frame members when said frame members are connected by said hinge pin passing through said bore.

4,883,320
SEAT STRUCTURE

Satoshi Izumida, and Katsumi Kitamura, both of Ayase, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Jul. 13, 1988, Ser. No. 218,265
Claims priority, application Japan, Jul. 17, 1987, 62-107582[U]
Int. Cl.[4] A47C 7/00
U.S. Cl. 297—452 7 Claims

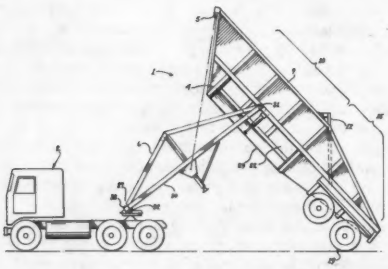


1. A seat structure comprising:
a seat frame;
a back frame;
sheet-like springs supported by said seat frame and by said back frame;
support panels fixed on each sheet-like spring for supporting selected portions of a person seated on the seat structure;
portions extending continuously from sides of each of said sheet-like springs;
reinforcing panels connected to said seat frame and to said back frame, each of which is curved slightly upward and fixed on a border between each of said sheet-like springs and each of said extended portions;
a strap-like rim piece fixed to an outer side of each of said extending portions; and
side support frames fixed to said seat frame and said back frame and to which said rim pieces are hooked.

4,883,321
COMBINATION REAR DUMP AND BOTTOM DUMP SEMI TRAILER

Wallace D. Voigt, 5985 Sunnyside Rd., SE, Salem, Oreg. 97302

Continuation-in-part of Ser. No. 856,676, Apr. 25, 1986, Pat. No. 4,733,451. This application Dec. 30, 1987, Ser. No. 139,680
Int. Cl.[4] B60P 1/56
U.S. Cl. 298—17.7 4 Claims

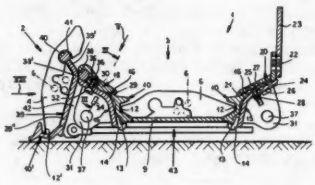


1. A combination rear dump and bottom dump trailer apparatus, comprising:
attaching means to attach said trailer apparatus to a truck to pull said trailer apparatus;
hopper means for holding cargo, said hopper means having a front end means a rear end means, two side means connecting said front end means and said rear end means, and a bottom means, said front end means, side means, rear end means and bottom means forming a container for said cargo;
rear dump means for allowing dumping of cargo through said rear end means of said hopper means said rear dump means comprising a rear chute means for allowing said cargo to slide out of said hopper means while said front end means of said hopper means is elevated;
bottom dump means for allowing dumping of cargo through said bottom means of said hopper means, said bottom dump means comprising:
bottom door means for discharging cargo through said bottom means of said hopper means; and
at least one power assisted operable door opening means for moving said bottom door means between open and closed positions, said bottom dump means being under said hopper means; and
bottom dump power assist means to apply power to said bottom dump means.

4,883,322
MINING AND CONVEYING APPARATUS

Günter Blumenthal, Westerholt; Heinz Kunzer, and Kurt Plaga, both of Herne, all of Fed. Rep. of Germany, assignors to Bochumer Eisenhutte Heintzmann GmbH & Co. KG, Bochum, Fed. Rep. of Germany

Filed Dec. 15, 1988, Ser. No. 284,976
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1987, 3743239
Int. Cl.[4] F21C 25/56
U.S. Cl. 299—34 16 Claims



1. In an apparatus for mining a mineral seam and for conveying said minerals in the mine longitudinal direction comprising a trough-like conveyor portion assembled from a plurality of pan-like members, a basin-like digging portion pivotally attached vertically to the upper edge of said conveyor portion on the breast wall side of said apparatus which with regard to the length of a pan of said digging portion is balanced relative to the length of a pan-like member of said conveyor portion and a chain conveyor guided positively in said conveyor portion and in said digging portion incorporating a plurality of digging tools and carrier members, the improvement wherein:
each of said pan-like members of said conveyor portion comprises two guide pieces which are mirror images of each other and which form a channel attached to each other by a base plate, said guide pieces engaging and fitting with a bottom side centering strip in a plurality of comparatively short members distributed over the length of said pan-like member of said conveyor portion which are parts of two-legged bent plates extending beyond said guide pieces and are clamped releasably with top side clamping strips between said bent plates and a plurality of clamping plates screwable to said bent plates;
each of said trough parts of said digging portion extends from an unequal-legged bent basin-like plate, a guide bead being provided on the upper longitudinal edge of said basin-like plate and another guide piece identical with said

guide piece of said conveyor portion attached to the lower longitudinal edge of said basin-like plate;

a substantially circular cross section strip is attached to the vertex of both legs of said basin-like plate, which is clamped between said bent plate on said breast wall side and said clamping plates are screwed thereon so as to be pivotable; and

a plurality of coupling members and a plurality of cross-pieces with mounting recesses are fastened in the vicinity of the screws for said clamping plates under said bent plates.

4,883,323

LONGWALL MINING MACHINE FOR THE MINING OF THICK MINERAL SEAMS

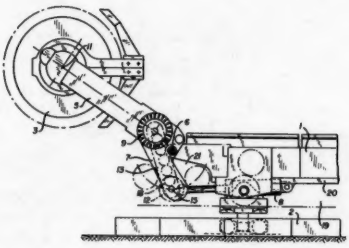
Friedhelm Henrich, Bochum, and Werner Hellmuth, Dortmund, both of Fed. Rep. of Germany, assignors to Gebr. Eickhoff Maschinenfabrik und. Eisengieberei mbH, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,363

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1987, 3736609

Int. Cl.[4] E21B *25/10*

U.S. Cl. 299—42 **6 Claims**



1. A drum cutter mining machine for releasing material from a thick mine seam while traversed along a conveyor, said drum cutter mining machine including the combination of:

a machine body including body portion traversing said conveyor above a material transportation portion while moving back and forth along said conveyor;

a support arm pivotally connected by pivotal to said machine body at an end thereof for leading and trailing with respect to movement of the machine body along said conveyor;

a cutting drum rotatably supported by an extended end portion of said support arm for releasing material from the mine seam;

a drive motor for rotating said cutting drum, said drive motor being supported above said conveyor by said support arm for allowing passage of debris on the conveyor beneath the drive motor and said body which bridges the conveyor;

a jib secured to a surface of said drive motor which is turned away from the support arm for support thereby;

an auxiliary cutting drum rotatably mounted at an extended end of said jib which projects from the drive motor;

gear means for drivingly interconnecting said drive motor and said auxiliary cutting drum;

said jib having an extended length such that the auxiliary drum is situated thereby below the axis of pivotal movement formed by said pivot when said support arm is in a central position to its range of pivotal movement ranging between operation of the cutting drum at the mine roof and at the mine floor; and

means supported by said machine body and connected to said support arm for pivoting said support arm to locate the cutting drum carried thereby for operation at the roof of the mineral seam and at other times at the floor of the mineral seam, said auxiliary cutting drum being concurrently positioned by operation of said means from a position below the pivotal axis to operating positions where the operating height of the auxiliary cutting drum above the conveyor is substantially the same independently of whether the cutting drum is operating at the roof or the floor of the coal seam.

4,883,324

SUPPORT BLOCK FOR TRACK ADJUSTMENT WHEELS

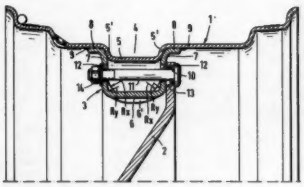
Willi Fuchs, Hennef, and Werner Kermelk, Much, both of Fed. Rep. of Germany, assignors to Lemmerz-werke KGaA, Koenigswinter, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,295

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1988, 3821533

Int. Cl.[4] B60B *23/12*

U.S. Cl. 301—9 TV **17 Claims**



1. A support block for track adjustable wheels having felloes and wheel dishes, the block comprising:

two profile members, each having a lower edge and first and second ends; and a profile bar having first and second end regions and an intermediate region, and joining said lower edges of the profile members to form a substantially U-shaped cross-section;

along the intermediate region, the profile bar and each profile member meet at a first inner radius of curvature;

in said first and second end regions the profile bar is arched away from the profile members, and the bar has a second inner radius of curvature in said end regions which is greater than said first inner radius of curvature;

the first and second ends of the profile members being connectable to the felloes.

4,883,325

ANTI-LOCK BRAKE CONTROL SYSTEM FOR MOTOR VEHICLES

Haruki Shimanuki, Kasukabe; Takao Maki, Kitakatsushika, and Yoshio Takahashi, Ohmiya, all of Japan, assignors to Akebono Brake Industry Co., Ltd., Japan

Filed Feb. 9, 1989, Ser. No. 308,823

Claims priority, application Japan, Feb. 12, 1988, 63-28924

Int. Cl.[4] B60T *8/82*

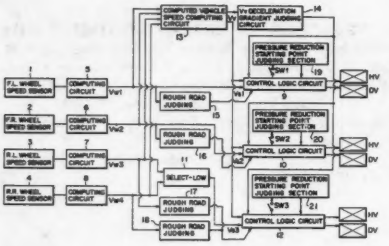
U.S. Cl. 303—96 **13 Claims**

1. An anti-lock control system for motor vehicles wherein a respective wheel speed Vw of the motor vehicle is detected; a computed vehicle speed Vv approximate to the real vehicle speed is calculated on the basis of the detected wheel speeds; a reference wheel speed Vr is set up which follows said wheel speed Vw with a predetermined speed difference ΔV and decelerates from a point of time when the deceleration of the wheel speed Vw becomes equal to a predetermined value; and reduction of the brake hydraulic pressure is started at a point of time when the decelerating wheel speed Vw becomes equal to the reference wheel speed Vr, said anti-lock control system comprising:

a first means for setting up first and second threshold values

Vv1 and Vv2 which follow said computed vehicle speed Vv with predetermined speed differences ΔV1 and ΔV2, said first threshold value being higher than said second threshold value;

a second means for measuring a time period T during which said wheel speed Vw which accelerates and decelerates in repetition reciprocates once between said first and second threshold values Vv1 and Vv2; and



a third means for changing said reference wheel speed Vr to a second reference wheel speed Vr' on the basis of a predetermined speed difference ΔV' which is greater than said speed difference ΔV when it is detected that the time period T is shorter than said predetermined time period T1.

4,883,326

VEHICLE BRAKING SYSTEM FOR DRIVE WHEELS, HAVING MEANS FOR DELAYING COMMENCEMENT OF BRAKE PRESSURE CHANGE

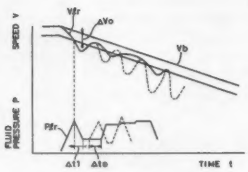
Tatsuo Sugitani, Mishima; Kiyoyuki Uchida, Susono, and Hideo Inoue, Yamakita, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Mar. 3, 1988, Ser. No. 163,784

Claims priority, application Japan, Mar. 11, 1987, 62-55583

Int. Cl.[4] B60T *8/58, 8/64*

U.S. Cl. 303—110 **8 Claims**



1. A braking system including a hydraulically operated brake for braking a drive wheel of a motor vehicle driven by a drive system, comprising:

slip-detecting means for detecting an amount of slip of said drive wheel and producing output signals indicative of the detected amounts of slip of the drive wheel;

pressure-regulating control means connected to said slip-detecting means, for increasing or decreasing a fluid pressure to be applied to said brake in response to each output signal whose value indicates a pressure-increase or pressure-decrease condition which requires an increase or decrease in said fluid pressure, respectively, whereby the amount of slip of said drive wheel is maintained within an optimum range; and

delay means operative to reduce a tendency of resonance of the drive system by commanding said pressure-regulating control means to delay commencement of pressure-increasing control, upon the establishment of at least one of a plurality of occurrences of said pressure-increase condition and irrespective of the magnitude of said fluid pressure at a point of time at which the at least one pressure-increase condition is established, said delay to continue for a predetermined time duration from said point of time such that during said delay, no pressure-increasing control is effected, said pressure-regulating control means commencing the delayed pressure-increasing control to increase said fluid pressure, upon expiration of aid predetermined time duration.

4,883,327

HYDRAULIC ANTI-LOCK BRAKING SYSTEMS FOR VEHICLES

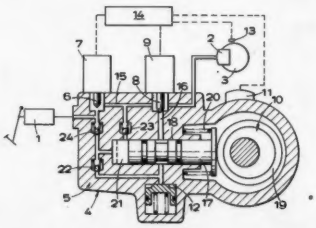
Glyn P. R. Farr, Warwickshire, England, assignor to Lucas Industries, Great Britain

Filed Jan. 19, 1989, Ser. No. 299,402

Claims priority, application United Kingdom, Jan. 30, 1988, 8802091

Int. Cl.[4] B60T *8/40, 13/70*

U.S. Cl. 303—116 **11 Claims**



1. An hydraulic anti-lock braking system for a vehicle comprising a brake on a wheel of the vehicle, an hydraulic master cylinder for supplying hydraulic fluid under pressure to said brake to apply said brake, modulator means for modulating the supply of pressure fluid from said master cylinder to said brake in accordance with the behaviour of said braked wheel, said modulator means comprising fluid storage means comprising an expansion chamber, a first control valve located between said master cylinder and said brake and movable between a first open position to provide communication between said master cylinder and said brake and a second closed position to isolate said brake from said master cylinder, a second control valve located between said brake and said expansion chamber and movable between a first closed position to isolate said brake from said expansion chamber and a second open position in which fluid in said brake is dumped to said expansion chamber, a motor, and a pump driven by said motor to produce an output which generates energy necessary to recover fluid in order to re-apply said brake automatically after said pressure fluid applied to said brake has first been released to said expansion chamber in response to movement of said second control valve into said second open position, said pump comprising a pump plunger movable in opposite first and second directions during an induction stroke and a power stroke respectively, means defining a pressure space in advance of said plunger, a one-way inlet valve through which fluid is adapted to be withdrawn from said expansion chamber into said pressure space upon movement of said plunger in said first direction, a first passage means defining a first connection between said pressure space and said brake, first flow-control means disposed in said first passage means through which fluid is pumped back to said brake, and a second passage means defining a second connection between said pressure space and said master cylinder, and second flow-control means disposed in said second passage means through which fluid is pumped back to said master cylinder, said first flow-control means including first pressure-responsive means responsive to pressure in said brake

in opposition to flow from said pump to said brake, said second flow control means including second pressure-responsive means responsive to pressure in said master cylinder in opposition to flow from said pump to said master cylinder, and one of said pressure-responsive means exhibiting a greater resistance to flow than the other of said first pressure-responsive means, whereby fluid is returned by said pump to both said brake and said master cylinder.

4,883,328

BRAKE SYSTEM WITH ANTI-LOCKING AND/OR TRACTION SLIP CONTROL

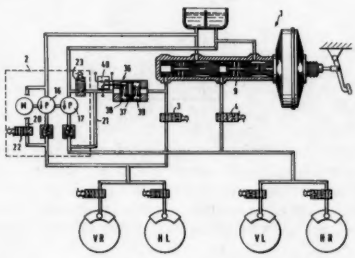
Jochen Burgdorf, Offenbach-Rumpenheim, and Lutz Weize, Mainz, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 20, 1988, Ser. No. 247,019

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732161

Int. Cl.[4] B60F *8/32*

U.S. Cl. 303—116 **14 Claims**



1. An automotive brake system including slip control control comprising pressure fluid conduits connected to a brake pressure generator and wheel brakes, electrically controllable multi-way valves in said pressure fluid conduits, said multi-way valves normally open in one switching position and re-switchable to block pressure fluid passage during a regulating phase, at least one normally open separating valve in said pressure fluid conduit, said normally open separating valve being switchable to block said pressure fluid conduit during the regulating phase, a controllable auxiliary pressure supply system, a pressure compensating reservoir connected to the brake pressure generator and to the auxiliary pressure supply system, electronic circuit means for processing electric signals from wheel sensors representing wheel rotational behavior and for generating electric brake pressure control signals for operating the multi-way valves, the separating valve and the auxiliary pressure supply system, said auxiliary pressure supply system comprising at least one bypass-regulated hydraulic pump connected to the wheel brakes, and a bypass conduit connected in parallel to the hydraulic pump including at least one additional multi-way valve dischargeable into the pressure compensating reservoir and differential pressure detecting means coupled to said brake pressure generator for comparing the pressure in said brake pressure generator with the auxiliary pressure of said auxiliary pressure supply system and means responsive to said differential pressure detecting means to control said auxiliary pressure supply system.

4,883,329

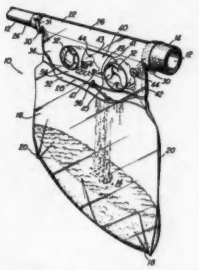
ASBESTOS CONTAINMENT BAG WITH SLIDE FASTENER CLOSURE

Gene Flannery, Thomasville; T. Blair Crouse, Lexington, and Wesley L. Patterson, Thomasville, all of N.C., assignors to Abatement Technologies, Inc., Duluth, Ga. and CPP, Inc., Thomasville, N.C.

Filed Oct. 14, 1988, Ser. No. 257,711

Int. Cl.[4] A61G *11/00*

U.S. Cl. 312—1 **5 Claims**



1. A hazardous waste containment bag for use in removing waste from a pipe, comprising:

(a) a section of plastic film configured to form a container having an interior and an opening defined by free film edges,

(b) a slide fastener assembly comprising a first slide fastener attached to plastic film gussets affixed to the film section within the interior to divide the container into waste-receiving and workspace chambers, the assembly having sufficient width to avoid significantly drawing the film section together when the waste-receiving chamber contains waste and the first slide fastener is closed, and the gussets being of different widths so that the slide fastener assembly may lie flat when the waste-receiving chamber is empty.

(c) at least one glove and sleeve appliance mounted in the film section to provide access to the workspace chamber,

(d) a second slide fastener attached to portions of the free film edges for drawing such edges together in order to surround a portion of the pipe and close the container opening, and

(e) at least one loop attached to the film to receive a strap for cinching the film snugly around the pipe.

4,883,330

SPINE ASSEMBLY

Eric J. Armstrong, Pennsburg, and David D. McClanahan, Lansdale, both of Pa., assignors to Knoll International, Inc., New York, N.Y.

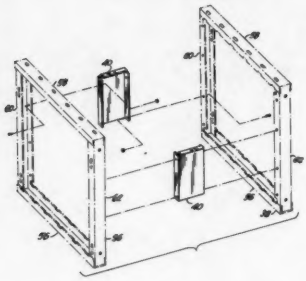
Continuation of Ser. No. 923,409, Oct. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 618,492, Jun. 8, 1984, Pat. No. 4,619,486. This application May 11, 1988, Ser. No. 193,239

Int. Cl.[4] A47B *17/00*

U.S. Cl. 312—195 **14 Claims**

1. A spine system assembly for supporting desk tops and panels and accessories comprising a plurality of housings joined end-to-end to create an interconnected network of such housings each housing being open on the bottom and adapted to being free-standing and comprising a first and second framework each framework being defined by first and second upwardly extending supports said first and second upwardly extending supports being connected by an upper and lower transverse member, said first and second frameworks being

connected by at least one pair of transverse members said transverse members connecting the upwardly extending support of one framework with the upwardly extending support of said second framework to form a housing said housing having a spaced apart substantially parallel side panels removably connected to each of said frameworks, said frameworks lying totally within the space between said side panels, said frame-



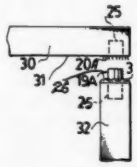
works being spaced apart from each other to permit the unimpeded laying of electrical wiring within each housing, said housing having a means for attaching end panels and said housing having a means for connecting one or more housings to form a spine assembly said housing being adapted to connect a bracket for supporting a panel above said housing and said housing being adapted to support a cover assembly and a desktop on its upper surface.

4,883,331

METHOD OF AND STRUCTURE FOR THE JOINING OF SUBSTANTIALLY RIGID PARTS TOGETHER

Craig Mengel, 2114 Robinson Street, Regina, Saskatchewan, Canada (S4T 2P7)

Filed Jul. 19, 1988, Ser. No. 221,120
Claims priority, application Canada, Jul. 24, 1987, 548982
Int. Cl.[4] A47B *17/00*
U.S. Cl. 312—195 **2 Claims**



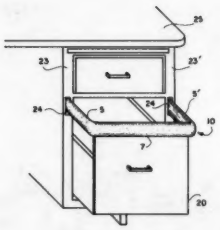
1. A knock-down kit of substantially rigid parts for the construction of furniture and the like comprising a plurality of parts and means to detachably fasten said parts together in the desired relationship to form the assembled furniture, said means including one portion of a hook and loop fastening material secured to the mating surface of one of said parts and the other portion of said hook and loop fastening material to the mating surface of the other of said parts, and means to mechanically align said parts in the desired relationship one with the other just prior to engaging said hook and loop portion together in detachable fastening relationship, said kit including a pair of floor engaging desk pedestals, a rear panel and a desk top panel, said hook and loop portions being secured in matching relationship, firstly on the mating surface of the upper side of said pedestals and on the mating surface of the underside of said desk top portion and secondly, upon the mating surfaces of the rear side of said pedestals and the mating surface of the inner side of said rear panel, said means to mechanically align said parts also engaging between the upper side of said pedestal and the under side of said top desk panel and between the rear sides of said pedestal and said rear panel, said means to mechanically align said parts comprises at least one dowel extending perpendicular from said mating surface of one of said parts and a matching aperture extending perpendicular from the mating surface of the other of said parts engageable with said dowel prior to the engagement of said portions of said hook and loop fastening material to one another in a detachable fastening relationship, and hook and loop portions being situated spaced from said dowels and said matching apertures.

4,883,332

ARM-KNEE AND LEG GUARD FOR DESKS AND FILE CABINETS

Ronald E. Hadad, 1140 Mill Rd., Richmond, Va. 23231

Filed Jul. 20, 1988, Ser. No. 221,634
Int. Cl.[4] A47B *88/00*
U.S. Cl. 312—330.1 **7 Claims**



1. A retractable body guard assembly for a furniture drawer having parallel, vertically disposed sides and a front side extending therebetween, said furniture drawer being enclosed in a drawer cabinet having parallel, vertically disposed inner and outer surfaces, said retractable body guard assembly comprising:

elongated panels of resilient material extending longitudinally adjacent said parallel, vertically disposed sides of the furniture drawer, said elongated panels are terminally joined to a transverse front panel of resilient material which extends horizontally adjacent said front side of the furniture drawer and securely fastened thereto; and

an associated channel-like track system longitudinally mounted to either of the parallel, vertically disposed surfaces of said drawer cabinet and adapted to support and guide said elongated panels of resilient material, wherein upon rectilinear displacement of the furniture drawer the elongated panels of resilient material slide substantially frictionlessly along associated tracks to effectively provide cushioning against impact when said furniture drawer is displaced in an open position and to prevent injuries on impact with protruding surfaces of the furniture drawer.

4,883,333

INTEGRATED, SOLID, OPTICAL DEVICE

Serge J. Yanez, 25395 Pine View Dr., Colfax, Calif. 95713

Filed Oct. 13, 1987, Ser. No. 106,650
Int. Cl.[4] G02B *6/00*
U.S. Cl. 350—96.10 **23 Claims**

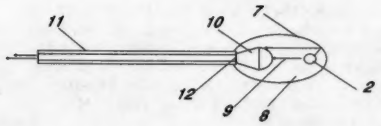
1. An optical device for radiant energy transmission comprising, in combination:

a source of energy,

a means for directing energy from said energy source to a light pipe including a solid mass of optical material which

collects and directs the energy, reflective means circumscribing at least a portion of said optical material for focusing the energy, a lens means interposed between said optical material and said light pipe,

and a luminaire at an end of said light pipe material remote



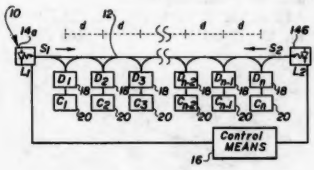
from said energy source to display the energy transmitted wherein said light pipe has a proximal end immersed into said lens means to improve energy transfer therebetween, defined by said proximal end placed within said lens means and dimensioned to tightly engage said proximal end.

4,883,334

OPTICAL SELECTOR SWITCH

Donald M. Chiarulli; Rami Melhem, and Steven P. Levitan, all of Pittsburgh, Pa., assignors to The University of Pittsburgh, Pittsburgh, Pa.

Filed Nov. 30, 1987, Ser. No. 126,931
Int. Cl.[4] G02B *6/10*
U.S. Cl. 350—96.13 **31 Claims**



1. An optical selector switch comprising:

an optical waveguide means;

M means for producing light that can be transmitted through the optical waveguide means, said M light producing means optically connected to the optical waveguide means, M being greater than or equal to 2;

means for controlling when each of the M light producing means produces optical pulses to be transmitted through the optical waveguide means; and

N optical transducers optically connected to the optical waveguide means and arranged in a three dimensional array, each of N optical transducers capable of producing an electrical signal corresponding to the combination of optical pulses received from the M light producing means, N being greater than or equal to 2.

4,883,335

SINGLE-MODE OPTICAL FIBER TAP

Rodney C. Alferness, Holmdel, and Thomas H. Wood, Highlands, both of N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 816,437, Jan. 6, 1986, abandoned. This application Jan. 20, 1988, Ser. No. 144,777
Int. Cl.[4] G02B *6/26*
U.S. Cl. 350—96.15 **8 Claims**

1. An optical communication system comprising a bus comprising at least two fiber taps,

said fiber taps comprising,

a. first input and first output means adapted for connecting said at least two optical fiber taps in series

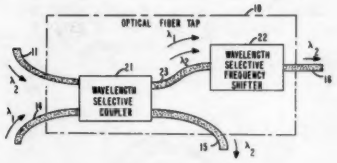
b. a second input means for receiving light from an optical transmitter, and

c. a second output means for delivering light to an optical receiver

the invention characterized in that

said optical fiber tap includes

a single mode coupler means having first and second input ports and first and second output ports for cross-coupling light having a first characteristic with high efficiency and for cross-coupling light having a second characteristic with lower efficiency,



said first and second input ports being connected to said first and second input means respectively, said second output port being connected to said second output means, and

single mode conversion means for converting light having said first characteristic to light having said second characteristic while passing virtually unchanged light having said second characteristic,

said single mode conversion means being connected to receive light from said first output port and to provide to said first output means, and

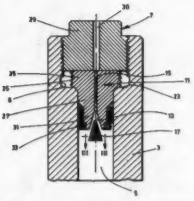
means, connected to said second input means, for varying said light of said first characteristic in a manner representative of intelligence.

4,883,336

METHOD AND LEADTHROUGH SYSTEM FOR LAYING OUT OPTICAL FIBRES ACROSS AN APERTURE OF A CONTAINER SHELL

Wojtek Bock, and Jacek Chrostowski, both of Gloucester, Canada, assignors to Conseil National de Recherches du Canada, Ottawa, Canada

Filed Feb. 17, 1989, Ser. No. 311,865
Int. Cl.[4] G02B *6/36, 7/26*
U.S. Cl. 350—96.20 **17 Claims**



9. A leadthrough system for optical fibres, said system comprising:

a plug member formed with an axial through fibre passage having a conical first portion and a second portion opening into said conical portion at the apex thereof;

an essentially conical wedge member having a size suitable for fitting into said conical portion, said wedge member

being formed with a plurality of grooves on the outer surface thereof, said grooves extending between the base and the apex thereof; said wedge member being inserted into said conical first passage portion with said grooves opening into said second passage portion;

a plurality of optical fibres divided into fractions of at least one fibre; each fraction being received individually into one of said grooves and said fractions being received collectively into said second passage portion, and

plastics material in said grooves and in said straight passage portion completely embedding said fibres and adhering to the surfaces of said grooves and of said passage portions.

4,883,337

LOW STRAIN OPTICAL FIBER COIL

Robert P. Dahlgren, Somerville, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Boston, Mass.

Filed Aug. 29, 1988, Ser. No. 237,779

Int. Cl.[4] G02B *6/02*

U.S. Cl. 350—96.29 **20 Claims**

1. An optical fiber coil forming an optical path for use in an instrument, such coil being characterized in that it comprises an unsupported fiber wound about itself along a defined curve such that mutual fiber-to-fiber contact of successive windings of said fiber maintain coil in a self-supporting ring.

4,883,338

SYNTHETIC RESIN OPTICAL FIBER

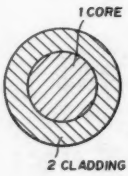
Tomiya Abe; Yukio Shimazaki; Takanobu Ishibashi; Norimoto Abe; Takayasu Asai, and Noriaki Taketani, all of Ibaraki, Japan, assignors to Hitachi Cable, Ltd. & Hitachi, Ltd., Tokyo, Japan

Filed Oct. 14, 1988, Ser. No. 262,334

Claims priority, application Japan, Oct. 15, 1987, 62-260380

Int. Cl.[4] G02B *6/00*; C08F *120/18*

U.S. Cl. 350—96.34 **5 Claims**



1. A synthetic resin optical fiber comprising:

a core of a transparent synthetic resin for the transmission of light and having a first predetermined refractive index; and

a cladding formed around the core and having a second predetermined refractive index lower than said first predetermined refractive index, said cladding layer containing 0.03 to 5 weight % of a light interruption substance such as a pigment or the like in a region of said cladding layer equal to or greater than half a wavelength of transmission light from the interface between said core and said cladding layer, said cladding layer including a region less than half a wavelength of transmission light from the interface between said core and cladding layer that is substantially free of the light interruption substance.

4,883,339

OXIDE COATINGS FOR FLUORIDE GLASS

Lubos J. B. Vacha, Southbridge, Mass.; Cornelius T. Monyihan, Watervliet, N.Y., and Peter C. Schultz, Sturbridge, Mass., assignors to Spectran Corporation, Sturbridge, Mass.

Filed Jul. 17, 1987, Ser. No. 74,646

Int. Cl.[4] B29D *11/00*; G02B *6/44*

U.S. Cl. 350—96.34 **29 Claims**

1. A method for making a coated optical fiber which is resistant to water or water vapor during preform handling, fiber drawing and fiber usage which comprises:

preparing a preform comprising a non-oxide glass core, a non-oxide cladding therefore, and a protective coating of an oxide glass having a glass transition temperature below about 400° C. and a thermal expansion coefficient of less than about 19×10^{-6}° C.$^{-1}$; and

drawing a fiber from said preform in a draw furnace without a protective atmosphere therefore, said oxide glass having a viscosity which is approximately the same as the viscosity of the non-oxide glass at the drawing temperature to obtain said coated optical fiber.

4,883,340

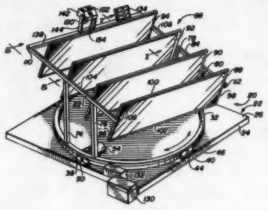
SOLAR LIGHTING REFLECTOR APPARATUS HAVING SLATTED MIRRORS AND IMPROVED TRACKER

Richard L. Dominguez, Glendale, Ariz., assignor to Solar Lighting Research, Inc., Glendale, Ariz.

Filed Aug. 2, 1988, Ser. No. 227,239

Int. Cl.[4] G02B *17/00, 27/00*; F24J *2/38*

U.S. Cl. 350—260 **17 Claims**



1. A solar lighting reflector apparatus for illuminating the interior of a roofed building during daylight hours and adapted to follow daily movements of the sun, the roofed building having a light transmissive opening in the roof therein, said apparatus comprising in combination:

a. a base;

b. means for rotatably supporting the base above the light transmissive opening of the roofed building;

c. a plurality of generally planar reflective panels for reflecting sunlight into the light transmissive opening, each of the reflective panels extending between first and second opposing ends along a generally horizontal longitudinal axis, the longitudinal axes of the plurality of reflective panels being parallel to each other, each of the plurality of reflective panels being supported by the base for rotation therewith, the plurality of reflective panels including at least a frontmost reflective panel and a rearmost reflective panel;

d. the rearmost reflective panel being supported at a higher elevation than the frontmost reflective panel to avoid shading of the rearmost reflective panel by the frontmost reflective panel; and

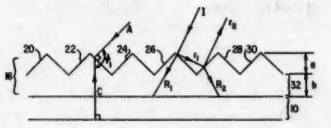
e. tracking means for rotating the base to direct the reflective panels toward the sun as the sun moves throughout each day.

4,883,341

NON-REFLECTIVE GRAPHIC SURFACE

Lorne A. Whitehead, Vancouver, Canada, assignor to Tir Systems LTD, Canada

Filed Mar. 17, 1988, Ser. No. 169,292
Claims priority, application Canada, Apr. 24, 1987, 535569
Int. Cl.[4] G02B *3/08, 5/04*
U.S. Cl. 350—276 R 27 Claims



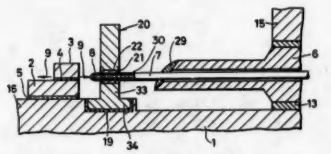
1. A graphic surface display device, comprising:
(a) a graphic surface to be displayed; and,
(b) a cover of substantially transparent material overlying said graphic surface, said cover having a minutely textured outer surface wherein an angle ϕ_1 between:
(i) a first vector normal to a randomly selected point on said outer surface; and,
(ii) a second vector which passes through said selected point and which is normal to a plane tangential to said graphic surface at the point of intersection of said second vector with said graphic surface;
has substantially unity probability of exceeding 45°.

4,883,342

METHOD OF ASSEMBLING A LIGHT EMITTING DEVICE WITH AN OPTICAL FIBER

Satoru Ishii, Tamamura; Tugio Nemoto, and Kunio Aiki, both of Takasaki, all of Japan, assignors to Hitachi, Ltd. & Hitachi Iruma Electronic Corp., Ltd., Tokyo, Japan

Continuation of Ser. No. 85,761, Aug. 17, 1987, Pat. No. 4,834,492. This application Dec. 5, 1988, Ser. No. 279,458
Claims priority, application Japan, Aug. 22, 1983, 58-151575
Int. Cl.[4] G02B *6/42*
U.S. Cl. 350—320 14 Claims



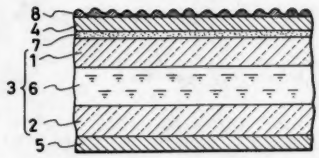
1. A method of assembling a light emitting device with an optical fiber comprising the steps:
(a) preparing a stem having a pedestal portion;
(b) fixing supporting means for an optical fiber on said stem, said supporting means having a hole and being deformable in three orthogonal directions;
(c) mounting a laser diode chip on said pedestal portion of said stem;
(d) inserting a portion of the optical fiber into said hole, and immovably fixed in said hole; and after said inserting;
(e) adjusting said supporting means in at least one of the three orthogonal directions to determine an optimum position of a photocoupled end part of said optical fiber relative to a light emitting portion of said laser diode chip and fixing the supporting means in the optimum position.

4,883,343

LIQUID CRYSTAL DISPLAY ELEMENT HAVING A Cr_2O_3 THIN FILM FOR PREVENTING DAZZLEMENT

Toshiyuki Teshirogi, Iwaki, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Mar. 25, 1988, Ser. No. 173,662
Claims priority, application Japan, Jul. 13, 1987, 62-107386
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—338 2 Claims



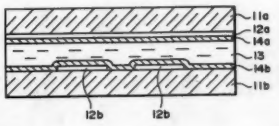
1. A liquid crystal display element having a liquid crystal cell formed by bonding front and rear transparent substrates, and a polarizing plate disposed on a display surface of the front transparent substrate comprising
a Cr_2O_3 thin film disposed on the display surface of the front transparent substrate.

4,883,344

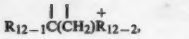
LIQUID CRYSTAL DEVICE HAVING A MODIFIED POLYVINYL ALCOHOL ALIGNMENT LAYER

Shinjiro Okada, Kawasaki; Kazuo Yoshinaga, Machida; Osamu Taniguchi; Hideyuki Kawagishi, both of Kawasaki; Akira Tsuboyama, Tokyo; Yukio Hanyu, Yokohama; Masataka Yamashita, Kawasaki, and Kazuharu Katagiri, Tama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

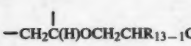
Division of Ser. No. 26,977, Mar. 17, 1987, Pat. No. 4,820,026.
This application Jan. 24, 1989, Ser. No. 300,922
Claims priority, application Japan, Mar. 20, 1986, 61-063457; May 15, 1986, 61-109444; May 15, 1986, 61-109445; May 15, 1986, 61-109446; May 15, 1986, 61-109447; May 15, 1986, 109448; May 15, 1986, 109449; May 15, 1986, 61-109450; May 15, 1986, 61-109451; May 22, 1986, 61-118531; Jun. 3, 1986, 61-128811; Jun. 3, 1986, 61-128812; Jun. 11, 1986, 133774; Jun. 11, 1986, 61-133775
Int. Cl.[4] G02F *1/13*
U.S. Cl. 350—339 R 67 Claims



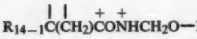
1. In a liquid crystal device, comprising: a pair of parallel substrates and a ferroelectric liquid crystal disposed between the substrates so as to have an arrangement of molecules forming a plurality of layers perpendicular to the faces of said pair of parallel substrates; the improvement wherein at least one of said pair of parallel substrates has an alignment control film formed of a modified polyvinyl alcohol resin containing a material selected from the group consisting of sulfur; boron;



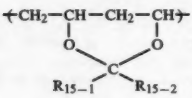
wherein R_{12-1} and R_{12-2} independently represent hydrogen, alkyl, aryl, alkyl having aryl, halogen, cyano or a residue derived from a heterocyclic ring;



wherein R_{13-1} is hydrogen or methyl and R_{13-2} is hydrogen or C_{1-4} alkyl;



R_{14-2}, wherein R_{14-1} is hydrogen or methyl and R_{14-2} is C_{1-4} alkyl; and



, wherein R_{15-1} and R_{15-2} are independently hydrogen, alkyl, aryl, allyl, lower alkyl having aryl, allyl, alkynyl or a saturated hydrocarbon group formed by cyclizing R_{15-1} and R_{15-2}, said modified polyvinyl alcohol having a function of aligning said plurality of layers preferentially in one direction.

4,883,345

PROJECTION OPTICAL APPARATUS

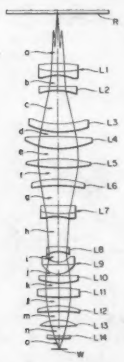
Satoru Anzai, Zama, and Hiroshi Tanaka, Yokohama, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 291,324

Claims priority, application Japan, Dec. 2, 1983, 58-228225; Dec. 2, 1983, 58-228226; Mar. 16, 1984, 59-50763

Int. Cl.[4] G02B *3/12*

U.S. Cl. 350—418 **10 Claims**



1. An apparatus for projecting a pattern on a first plane onto a second plane, comprising:

a projection lens system disposed between and spaced from said first plane and said second plane, said projection lens system including a plurality of lens element disposed at intervals and defining a plurality of spaces;

means for isolating at least one of said plurality of spaces from the atmosphere, said at least one space being selected such that, in the absence of the isolating of said at least one space from the atmosphere, variation in magnification of said projection lens system caused by variation of the pressure in said at least one space with atmospheric pressure is substantially equal to variation in magnification of said projection lens system caused by variation of the pressure in all of said plurality of spaces and in the spaces between said projection lens system and said first and second planes with atmospheric pressure; and

means for maintaining the refractive index in said at least one space of said projection lens system at a fixed value in spite of the variation of atmospheric pressure.

4,883,346

ZOOM LENS SYSTEM

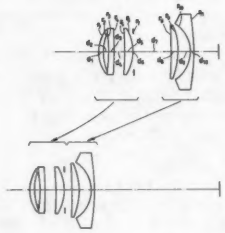
Norihiko Aoki, and Juro Kikuchi, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 3, 1988, Ser. No. 227,803

Claims priority, application Japan, Aug. 5, 1987, 62-194421

Int. Cl.[4] G02B *15/15, 9/60, 9/34*

U.S. Cl. 350—423 **9 Claims**



1. A zoom lens system comprising, in the order from the object side, a first lens group having positive refractive power and a second lens group having negative refractive power, and so adapted as to perform variation of focal length by varying an airspace reserved between the two lens groups, said second lens group comprising at least one positive lens component designed as a graded refractive index lens component.

4,883,347

STABILIZED POINTING MIRROR

Bradley G. Fritzel, Hermosa Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 22, 1988, Ser. No. 146,993

Int. Cl.[4] G02B *23/00;* G01C *15/14*

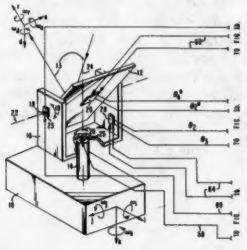
U.S. Cl. 350—500 **7 Claims**

1. A pointing mirror, having a line-of-sight and supported on gimbals about an elevation axis and an azimuth axis, and a system coupled to the mirror for stabilizing the mirror and, thus, for stabilizing its line-of-sight from three-dimensional rotational disturbances exerted upon the mirror, comprising:

a first two-degree-of-freedom gyroscope secured to the mirror and placed on a first of the axes, said first two-degree-of-freedom gyroscope being coupled to electronic means for providing inertial rates (ω_4*, ω_2*) of angular motion of the mirror respectively about an axis angled from a line normal thereto and about the first axis;

a second two-degree-of-freedom gyroscope secured to the gimbal on the second of the axes, said second two-degree-of-freedom gyroscope being coupled to electronic means for providing inertial rates (ω_2, ω_3) of angular motion of the mirror respectively about a pitch axis and a yaw axis;

means for computing inertial rates (ω_e, ω_d) of angular motion of the mirror respectively about a line-of-sight pitch axis and a line-of-sight yaw axis from the inertial rates (ω_4*, ω_2*, ω_2, ω_3); and



means for summing the inertial rates (ω_e, ω_d) to zero and thus for driving the mirror about its elevation and azimuth axes to stabilize its line-of-sight.

4,883,348

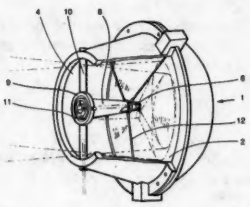
WIDE FIELD OPTICAL SYSTEM

Brett A. Spivey, 131 Seeman, Encinitas, Calif. 92024; Brian W. Neff, 9685 Genessee Ave. #F-2, San Diego, Calif. 92121, and Murray R. Dunn, 8870-202 Villa La Jolla Dr., La Jolla, Calif. 92037

Filed Jun. 10, 1988, Ser. No. 204,902

Int. Cl.[4] G02B *17/06, 17/08, 26/10*

U.S. Cl. 350—503 **14 Claims**



1. A telescope system for detecting electromagnetic radiation within a viewing range comprising:

a spherical concave primary mirror defining a focal surface and center of curvature,

a secondary optical means for directing beams of radiation reflected off said primary mirror to the vicinity of said center of curvature,

a positioning means for positioning said secondary optical means tangentially about said center of curvature at a plurality of positions, each of said plurality of positions being near said focal surface and the same distance from said focal surface,

a detector means for detecting all or a portion of said beams of radiation,

said primary mirror, said secondary optical means, said positioning means and said detector means, being arrange so that said positioning means positions said secondary optical means so as to permit said telescope system to scan said viewing range and to permit said detector means to detect all or portions of said beams of radiation within said viewing range without movement of said primary mirror or said telescope systems as a whole.

4,883,349

REAR VIEW MIRROR FOR MOTOR VEHICLES

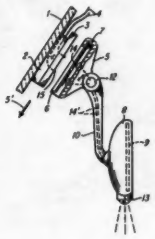
Bernhard Mittelhäuser, Am Krähenberg, 3002 Wedemark 2, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,491

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1987, 3734393

Int. Cl.[4] G02B *7/18, 5/08;* **B60R** *1/06*

U.S. Cl. 350—631 **10 Claims**



1. A rear view mirror for a motor vehicle, comprising:

an anchoring member that is fixedly mounted on said vehicle;

a part that is provided with a mirror body and that is adapted to be connected to said anchoring member by being pressed or otherwise placed thereon;

first electrical contact means disposed on said anchoring member and connected to a source of current; and

second electrical contact means disposed on said part provided with said mirror body in such a way that when said part is placed on said anchoring member, said first and second electrical contact means cooperate with one another such that a contact connection is established between said first and second contact means and hence between said anchoring member and said part provided with said mirror body.

4,883,350

CONTACT LENS PROVIDING A CENTRAL SPHERICAL REGION BOUNDED BY A CIRCUMSCRIBING ASPHERICAL REGION

Dieter Muckenhirn, Dorfstrasse 2, D-7801 Au, Fed. Rep. of Germany

PCT No. PCT/EP86/00269, § 371 Date Dec. 30, 1986, § 102(e) Date Dec. 30, 1986, PCT Pub. No. WO86/06848, PCT Pub. Date Nov. 20, 1986

PCT Filed May 7, 1986, Ser. No. 2,714

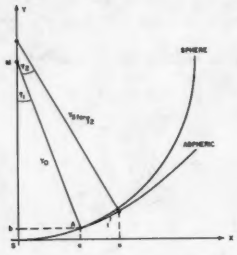
Claims priority, application Fed. Rep. of Germany, May 8, 1985, 3516575

Int. Cl.[4] G02C *7/04*

U.S. Cl. 351—160 R **26 Claims**

1. A contact lens comprising a rear surface presenting a central spherical region described by an arc passing through the vertex, characterized in that said central spherical region is circumscribed by an aspherical region defined by a curve adjacent the spherical region, said curve and said arc having a

substantially equal radius of curvature and a substantially equal gradient in the area of transition and further characterized in



that the arc extends up to an angle in the range of 10° to 20° measured from the center of curvature.

4,883,351

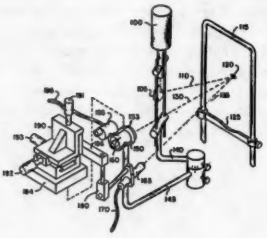
APPARATUS FOR THE DETECTION OF DIABETES AND OTHER ABNORMALITIES AFFECTING THE LENS OF THE EYE

Jeffrey N. Weiss, 77 Pond Ave., Brookline, Mass. 02146

Division of Ser. No. 416,654, Sep. 10, 1982, abandoned. This application Nov. 15, 1984, Ser. No. 671,520

Int. Cl.[4] A61B *3/10*

U.S. Cl. 351—221 **3 Claims**



1. In apparatus for measuring the movement of light scattering elements in the lens of an in vivo eye where the apparatus is of the type having

(a) means for providing a beam of light,

(b) means for focusing the light beam on a site in the lens of the eye,

(c) a photomultiplier,

(d) optical means for transmitting light back-scattered from the eye's lens to the photomultiplier, and

(e) correlator means for providing an output that is an autocorrelation function of light intensity variations affecting the photomultiplier's output,

the improvement wherein

the optical means for transmitting light back-scattered from the eye's lens to the photomultiplier is an optical fiber having a light receiving input end,

and the improvement further comprises

(i) a binocular microscope for providing a stereoscopic view of the site at which the light beam is focused in the lens, the optical axis of the binocular microscope being directed at an angle to the light beam sufficient to provide depth perception, and

(ii) the optical fiber having its input end disposed to enable the binocular microscope to focus light back-scattered from the eye's lens upon the input end of the optical fiber without impairing the stereoscopic view of the site.

4,883,352

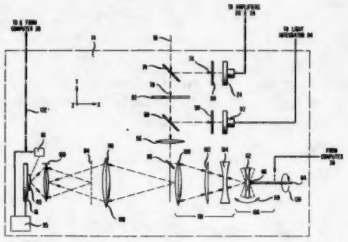
DEEP-UV LITHOGRAPHY

John H. Bruning, Brookside, N.J., assignor to American Telephone and Telegraph Company, Murray Hill, N.J.

Continuation of Ser. No. 939,278, Dec. 12, 1986, Pat. No. 4,773,750, which is a continuation of Ser. No. 874,883, Jun. 16, 1986, abandoned, which is a continuation of Ser. No. 623,247, Jun. 21, 1984, abandoned. This application Aug. 12, 1988, Ser. No. 231,803

Int. Cl.[4] G03B *27/42*

U.S. Cl. 353—122 **2 Claims**



1. Apparatus comprising:

means for providing laser radiation that inherently i s characterized by a relatively wide bandwidth;

a lens assembly, disposed in the path of said radiation, which exhibits unacceptably large chromatic aberrations in response to the relatively wide bandwidth radiation inherently provided by said means; and

means for sufficiently narrowing the bandwidth of said radiation to cause said assembly to exhibit acceptably low chromatic aberrations.

4,883,353

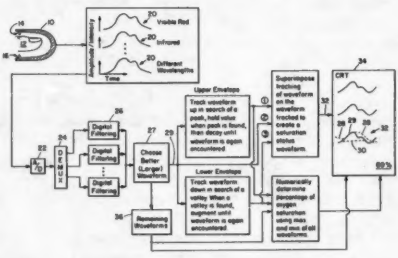
PULSE OXIMETER

Kenneth A. Hausman, Concord, and Edwin B. Merrick, Stow, both of Mass., assignors to Puritan-Bennett Corporation, Wilmington, Mass.

Filed Feb. 11, 1988, Ser. No. 154,929

Int. Cl.[4] G01N *33/49*

U.S. Cl. 356—41 **22 Claims**



1. A pulse oximeter comprising:

a sensor responsive to light transmitted through an area of blood flow and optically absorbed by hemoglobin for producing a pulsatile waveform indicating the current pulsatile component of blood flow;

process means for determining an amplitude of said pulsatile waveform;

a displayable process waveform for tracking said process means; and

display means for superimposing said displayable process waveform onto said pulsatile waveform to form a saturation status wave form and to display said saturation status wave form onto an output display, along with a calculated percentage of oxygenated blood.

4,883,354

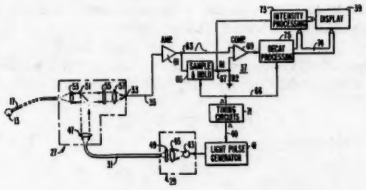
FIBEROPTIC SENSING OF TEMPERATURE AND/OR OTHER PHYSICAL PARAMETERS

Mei H. Sun, Los Altos; Kenneth A. Wickersheim, Menlo Park, and Stanley O. Heinemann, Irvine, all of Calif., assignors to Luxtron Corporation, Mountain View, Calif.

Division of Ser. No. 921,637, Oct. 22, 1986, Pat. No. 4,752,141, which is a continuation-in-part of Ser. No. 791,223, Oct. 25, 1985, abandoned. This application Mar. 4, 1988, Ser. No. 164,130

Int. Cl.[4] G01N *21/51*; G01K *11/20*

U.S. Cl. 356—128 **20 Claims**



1. A condition measuring system comprising:

a length of an optical fiber communication medium having first and second ends,

a sensor carried at said first fiber medium end, said sensor including an optically clear solid non-deformable light concentrator extending outwardly away from said first fiber end and providing a substantially unattenuated light path out of said concentrator through a surface thereof, and a layer of luminescent material attached to said surface,

means in optical communication with said second fiber communicating medium end for directing excitation radiation along said fiber and through said light concentrator to said luminescent material,

means in optical communication with said second fiber communication medium end for detecting a characteristic of luminescent radiation passing from the luminescent material through the light concentrator and optical fiber communication medium, thereby measuring said condition, and

means responsive to said detecting means for determining the refractive index of an environment surrounding said sensor.

4,883,355

SLOTTED THRUSTERS FOR FLUID PROPELLED BORESCOPES

Hamid Saghatchi, Burbank, and Geoffrey L. Taylor, Valencia, both of Calif., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Sep. 3, 1987, Ser. No. 92,669

Int. Cl.[4] G01N *21/88*

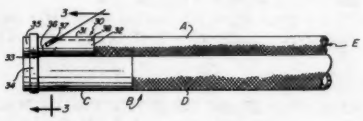
U.S. Cl. 356—241 **31 Claims**

1. A thruster adapted to attach to a borescope and to propel said borescope by the reaction force generated in response to pressurized fluid expelled from said thruster comprising:

a. an elongated, generally straight and cylindrically shaped, hollow body having an entrance opening communicating with the hollow interior of said body,

b. a bulkhead sealing an end of said body opposite said entrance opening,

c. a narrow aperture through the cylindrical wall of said



body, said aperture being located longitudinally between said entrance opening and said bulkhead, whereby pressurized fluid supplied to said hollow interior of said body through said entrance opening exits said hollow body through said narrow aperture, thereby producing a reaction thrust force on said thruster body.

4,883,356

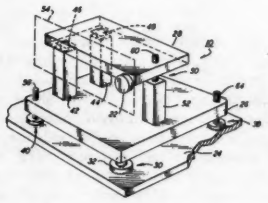
SPECTROMETER DETECTOR MOUNTING ASSEMBLY

Charles F. deMey, II, West Redding, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Sep. 13, 1988, Ser. No. 243,853

Int. Cl.[4] G01J *3/02*

U.S. Cl. 356—326 **14 Claims**



1. A spectrometer assembly comprising

means for producing a radiation beam from a sample for analytical detection, said radiation beam extending along an optical path,

a detector for detecting said radiation beam,

a housing having a base support, and

a detector mounting assembly for precisely aligning the detector relative to said radiation beam comprising

a first support plate

first pivotal connection means for pivotally connecting said first support plate to said base support so that said first support plate is selectively pivotal about first and second pivot axes,

first position adjustment means for selectively pivotally positioning said first support plate about said first pivot axis,

second position adjustment means for selectively pivotally positioning said first support plate about said second pivot axis,

a second support plate mounted to said first support plate,

second pivotal connection means for pivotally connecting said second support plate to said first support plate so that said second support plate is selectively pivotal about a third pivot axis, and

third position adjustment means for selectively pivotally positioning said second support plate about said third pivot axis,

said detector being mounted to said second support plate and positioned within said optical path, and

said first, second and third pivot axes being relatively positioned so that

(a) said first adjustment means pivots said detector along a first arc generally transverse to said radiation beam,

(b) said third adjustment means pivots said detector along a third arc generally transverse to said radiation beam and orthogonal to said first arc, and

(c) said second adjustment means pivots said detector along a second arc genera.lly along said radiation beam.

4,883,357

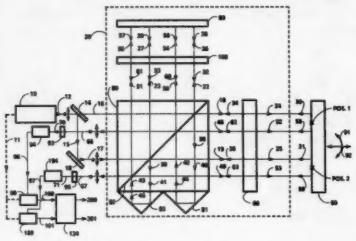
DUAL HIGH STABILITY INTERFEROMETER

Carl A. Zanoni, Middlefield, Conn., and Alan H. Field, San Jose, Calif., assignors to Zygo Corporation, Middlefield, Conn.

Filed Mar. 1, 1989, Ser. No. 317,672

Int. Cl.[4] G01B 9/02

U.S. Cl. 356—349 51 Claims



1. A dual high stability interferometer system capable of measuring linear displacement and angular displacement simultaneously of a movable plane mirror comprising a source of a frequency stabilized input beam with two linear orthogonally polarized components; means for dividing said input beam into two parallel, spatially displaced beams; optical system means comprising a stationary plane reference mirror, said optical system being disposed to reflect one polarization component of one of said spatially displaced beams twice from a first position on said movable plane mirror to produce a first output beam and to reflect the other polarization component of said spatially displaced beams twice from said stationary plane mirror to produce a second output beam; means disposed for recombining said first and second output beams into a third output beam having two orthogonally polarized components in which the phase difference between the two components of the third output beam is related to four times the linear displacement of said movable plane mirror at said first position; means disposed for mixing said orthogonal components of said third output beam; means disposed to produce a first electrical measurement signal; means associated with said first electrical measurement signal for indicating a first measured phase, said first measured phase being related to four times the linear displacement of said movable plane mirror at said first position; means disposed to reflect one polarization component of the second of said spatially displaced beams twice from a second position on said movable plane mirror to produce a fourth output beam and to reflect the other polarization component of said second of said spatially displaced beams twice from said stationary plane mirror to produce a fifth output beam; means disposed for recombining said fourth and fifth output beams into an sixth output beam having two orthogonally polarized components in which the phase difference between the two components of the sixth output beam is related to four times the linear displacement of said movable plane mirror at said second position; means disposed for mixing said orthogonal components of said sixth output beam; means disposed to produce a second electrical measurement signal; and means associated with said second electrical measurement signal for indicating a second measured phase, said second measured phase being related to four times the linear displacement of said movable plane mirror at said second position.

4,883,358

FIBER OPTIC GYRO STABILIZED BY HARMONIC COMPONENTS OF DETECTED SIGNAL

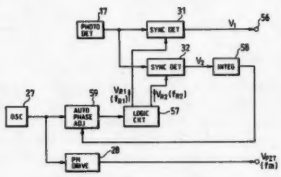
Kenichi Okada, Oume, Japan, assignor to Japan Aviation Electronics Industry Limited, Tokyo, Japan

Filed Aug. 25, 1988, Ser. No. 236,435

Claims priority, application Japan, Sep. 2, 1987, 62-220758; Sep. 2, 1987, 62-220759; Apr. 15, 1988, 62-93210; Jun. 3, 1988, 62-137781

Int. Cl.[4] G01B 9/02

U.S. Cl. 356—350 10 Claims



2. A fiber optic gyro comprising:

a circular optical path of at least one loop;

means for allowing light waves to pass through the optical path in both clockwise and counterclockwise directions;

interference means whereby the light waves having passed through the optical path are made to interfere with each other;

phase modulating means connected in cascade between the interference means and one end of the optical path, for phase modulating both light waves;

a photodetector for detecting, as an electric signal, the intensity of the interference light;

first synchronous detecting means whereby an odd-numbered harmonic component of the modulation frequency of the phase modulating means, contained in the photodetector output, is synchronously detected;

second synchronous detecting means whereby an even-numbered harmonic component of the modulation frequency of the phase modulating means, contained in the photodetector output, is synchronously detected; and

control means responsive to a signal from the second synchronous detecting means to effect control so that an input signal and a reference signal both applied to the first synchronous detecting means become substantially in-phase with each other and an input signal and a reference signal both applied to the second synchronous detecting means are displaced substantially 90 degrees apart in phase.

4,883,359

ALIGNMENT METHOD AND PATTERN FORMING METHOD USING THE SAME

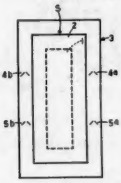
Hideki Ina, Kanagawa, and Akiyoshi Suzuki, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 120,165, Nov. 12, 1987, abandoned, which is a continuation of Ser. No. 57,649, Jun. 9, 1987, abandoned, which is a continuation of Ser. No. 705,523, Feb. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 125,827, Nov. 25, 1987, abandoned, which is a continuation of Ser. No. 705,537, Feb. 26, 1985, abandoned. This application Apr. 25, 1988, Ser. No. 186,773

Claims priority, application Japan, Feb. 28, 1984, 59-35322; Feb. 28, 1984, 59-35330

Int. Cl.[4] G01B *11/00*

U.S. Cl. 356—401 **2 Claims**



1. An alignment and exposure method comprising the steps of:

placing a workpiece on a holder having first and second alignment marks;

placing a first mask having a third alignment mark, which is alignable with the first alignment mark of the holder, so that the first mask is opposed to a first region of the workpiece;

aligning the first mask and the first region of the workpiece by use of the first and third alignment marks;

exposing the first region of the workpiece to an exposure beam transmitted through the first mask;

placing a second mask having a fourth alignment mark, which is alignable with the second alignment mark of the holder, so that the second mask is opposed to a second region of the workpiece, the second region being contiguous to the first region of the workpiece;

aligning the second mask and the second region of the workpiece by use of the second and the fourth alignment marks; and

exposing the second region of the workpiece to an exposure beam transmitted through the second mask.

4,883,360

METHOD AND APPARATUS FOR AUTOMATICALLY ADJUSTING WHITE BALANCE

Yukihiro Kawada, and Yoshiaki Nakayama, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

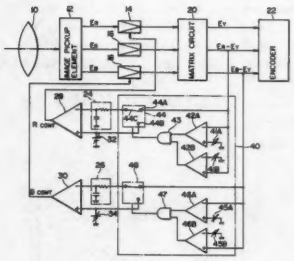
Filed Aug. 12, 1988, Ser. No. 231,474

Claims priority, application Japan, Aug. 13, 1987, 62-202509; Aug. 13, 1987, 62-202510; Aug. 13, 1987, 62-202511

Int. Cl.[4] G01J *3/46*

U.S. Cl. 356—402 **8 Claims**

1. A method of automatically adjusting white balance in which color difference signals (E_R–E_Y) and (E_B–E_Y) are created respectively from signals obtained by photographing an object, the color difference signals are respectively integrated over the entire screen, and the gains of red and blue signals are controlled so that the integration average values can be identical with predetermined reference levels respectively; said method being characterized in that, with respect to said respective color difference signals, there is set a slice level for detecting a strong color difference, and that, if, among said respective color difference signals, there is present a strong color difference signal which exceeds said slice level, in place of said strong color difference signal a predetermined level representing a weaker color difference signal than said slice level or the



same level of said slice level is integrated to thereby remove said strong color difference signal from said respective color difference signals are to be individual.

4,883,361

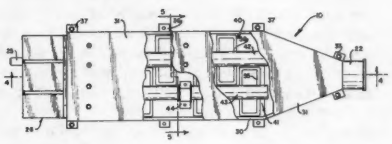
DOUGH PROCESSING APPARATUS

Frank Valentino, Hickory Hills, Ill.; David E. Betts, Pataskala, Ohio, and Edward A. Alesch, Richardson, Tex., assignors to B-V Dough Handling Systems, Inc., Pataskala, Ohio

Filed Jun. 9, 1988, Ser. No. 204,385

Int. Cl.[4] B01F *7/02, 7/04, 15/02*

U.S. Cl. 366—97 **15 Claims**



1. Apparatus for developing dough comprising

an elongated chamber having an inlet at one end and an outlet at the opposite end whereby dough may be caused to flow axially therethrough,

dough conditioning means disposed in said chamber for developing the dough flowing through said chamber, said conditioning means including at least two elongated rotors extending axially through said chamber in side by side relationship to each other, each of said rotors having an elongated shaft and a plurality of dough conditioning bars mounted on said shaft, each of said bars being formed from a rigid rod bent into a substantially U-shaped configuration having two spaced apart legs and a web interconnecting said legs at one end with said legs secured at their opposite ends to a respective one of said shafts and projecting a distance laterally outward from said shaft thereby supporting the web in radially outward relationship to said shaft, said bars being oriented to place the legs thereof in a plane that extends substantially axially of the respective shaft and axially spaced apart on a shaft a distance to permit passage of a bar on the other shaft between a pair of adjacently disposed bars on the first mentioned shaft,

support means provided for each of said rotors for support of the rotors for revolution about their respective axes spaced a distance apart whereby the conditioning bars on each rotor shaft revolve in planes that overlap the plane of revolution of a next adjacent conditioning bar on the other rotor shaft, and

drive means mechanically coupled with said rotors for revolving said rotors.

4,883,362

DEVICE FOR ENRICHING A CARRIER GAS WITH THE VAPOR OF A SPARINGLY VOLATILE SUBSTANCE

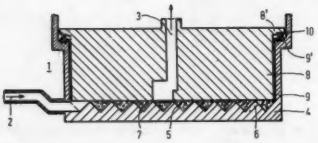
Georg F. Gärtner; Hans Rau, both of Aachen, and Peter A. Janiel, W/e,uml/u/ rselen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

Filed Jan. 27, 1988, Ser. No. 148,800

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1987, 3702923

Int. Cl.[4] B01F *13/02*

U.S. Cl. 366—101 18 Claims



1. A device for enriching a carrier gas with the vapor of a volatile material composed of relatively small solid particles comprising:

a container having an outer wall and at least one side wall;

a tightly fitting metal body insertable within said container, said metal body having a surface for engagement with the outer wall of said container;

at least one of said outer wall of said container and said engagement surface of said metal body having at least one spiral groove forming a heatable inner space for holding the volatile material through which the carrier gas passes and flows, said grooves having a wedge-like cross section with the tips of the wedges disposed in contact with the other of said outer wall of said container and said engagement surface of said metal body to separate the individual turns of the groove from each other;

an inlet duct leading to one end of said spiral groove for entry of the carrier gas; and

an outlet duct disposed at the other end of said spiral groove for outletting said enriched carrier gas.

4,883,363

DEVICE INTER ALIA FOR UNIFORMLY DISTRIBUTING SOLID AND/OR LIQUID PARTICLES, AND AN ASSEMBLY COMPRISING SUCH A DEVICE

Francis D. Pillon, 33 rue d'Amiens, and Michel A. Andriot-Ballet, 9 avenue de Bourgogne, both of 60000 Beauvais, France

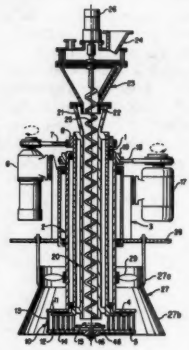
Filed Sep. 8, 1988, Ser. No. 241,664

Claims priority, application France, Sep. 8, 1987, 87 12441

Int. Cl.[4] B01F *7/16, 15/02;* B02C *13/22;* B65G *65/32*

U.S. Cl. 366—157 11 Claims

1. A device inter alia for uniformly distributing solid and/or liquid particles, characterised in that it comprises, on the one hand, a hollow vertical primary shaft (1) driven in rotation, the bottom end comprising a substantially horizontal primary ring (4) the bottom surface of which bears vertical teeth (5) disposed in concentric circles, the device on the other hand comprising a hollow vertical secondary shaft (2) in which the primary shaft (1) is coaxially disposed and which is driven in rotation in the opposite direction to the rotation of the primary shaft (1), the bottom end of the secondary shaft comprising a cylindrical cage (10) containing a secondary ring (11) secured to the aforementioned bottom end and wider than the primary ring (4) and a disc (12) connected to the bottom surface of the secondary ring (11) by at least three bars (13), the top surface of the disc (12), which faces the bottom surface of the secondary ring (11), comprising on the one hand vertical teeth (14) disposed concentrically and staggered with respect to the teeth (5) on the first ring (4) disposed inside the cylindrical cage (10), and on the other hand comprising a central circular anvil (15)



coaxial therewith and at least equal in diameter to the primary shaft (1).

4,883,364

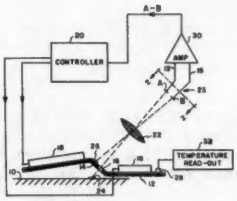
APPARATUS FOR ACCURATELY MEASURING TEMPERATURE OF MATERIALS OF VARIABLE EMISSIVITY

Robert W. Astheimer, Westport, Conn., assignor to Barnes Engineering Company, Shelton, Conn.

Filed Nov. 14, 1988, Ser. No. 270,735

Int. Cl.[4] G01J *5/06, 5/12*

U.S. Cl. 374—129 1 Claim



1. In a temperature measuring apparatus for determining the temperature of a target material to be measured as compared to the temperature of a spaced reference source having temperature control means for controlling the temperature of the

spaced reference source and differential radiation detector means having first detector means exposed to said target material for measuring the temperature of said target material and exposed to said reference source for measuring the temperature of the reference source, the improvement comprising:

means for locating said differential radiation detector means in spaced relationship to said target material and said reference source,

said reference source is a plate having a step near the center of said plate, said step containing a hole therein,

optical means for focusing said differential radiation detector means through said hole onto said target material and said reference source, said first detector means of said differential radiation detection means being exposed to said target material and said second detector means being exposed only to said reference source, said step containing said hole permitting viewing the target material at an angle through said hole to prevent reflection from said detector means back through said hole.

means for combining the outputs of said first and second detector means to produce a differential error signal,

means for applying said differential error signal to said temperature control means for driving said reference source to the same temperature of said target material, and

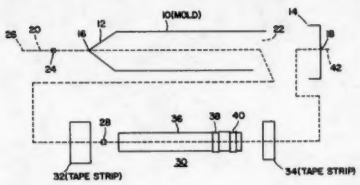
temperature read out means for indicating the temperature read out means for indicating the temperature of said reference source which will have the same as that of said target material when the differential error signal in zero regardless of the emissivity of the target material.

4,883,365

DEVICE FOR MEASURING SUBSURFACE TEMPERATURES OF LIQUID BODIES, USEFUL FOR DETERMINING OPTIMUM FISHING LOCATIONS

Bruce F. Monzyk, 2254 Murray Forest, Maryland Heights, Mo. 63043, and Lloyd A. Woodard, 7322 E. 107th St., Kansas City, Mo. 64134

Filed May 7, 1987, Ser. No. 46,782
Int. Cl.[4] G01K *1/14, 13/00*
U.S. Cl. 374—136 **26 Claims**



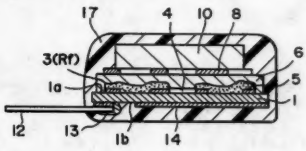
1. A device for measuring temperature in a liquid body comprising: a temperature sensing element integrally embedded in a thermally insulated matrix material selected from plastics and glasses, and mixtures thereof; said matrix material being chemically resistant to the liquid whose temperature is to be measured; said material having sufficient non-wetting and insulating properties to provide a heat flow pattern from the liquid such that the matrix assumes the temperature of the liquid at a desired level below the surface, and enable the temperature sensing element to measure and retain the temperature at the desired level sufficiently long that it may be observed and/or recorded after the device is removed from the liquid; weight means for ensuring that the device will assume a position at the desired level below the surface of the liquid; and means for supporting the device at the desired level for a time sufficient for the temperature of the liquid at the desired level to be transferred to the matrix material, and then to the sensing element, and said supporting means removing the device from the liquid after the temperature of the liquid at the desired level has been measured.

4,883,366

TEMPERATURE SENSOR

Katsuji Dohi, Kyoto; Akira Kumada, and Michihiro Murata, both of Kanagawa, all of Japan, assignors to Murata Mfg. Co., Ltd., Kyoto, Japan

Filed Sep. 28, 1988, Ser. No. 250,738
Claims priority, application Japan, Sep. 29, 1987, 62-245270
Int. Cl.[4] G01K *7/34*
U.S. Cl. 374—184 **5 Claims**



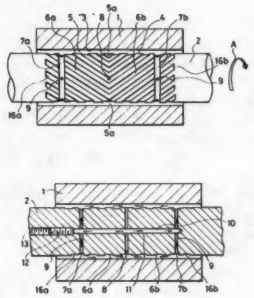
1. A temperature sensor comprising a capacitor having electrodes between which a dielectric body having its dielectric constant variable depending on the variations of temperature is interposed, said capacitor being used to define a CR oscillating circuit, said dielectric body being made of a ceramic dielectric material which has a working temperature range in the normal dielectic phase and a dielectric constant having its temperature coefficient ranged between −1,000 ppm/°C. and −10,000 ppm/°C., said ceramic dielectric body being also used as a substrate on which said CR oscillating circuit is formed, said CR oscillating circuit being of a laminated construction which is formed by covering the surface of the ceramic dielectric body which an insulating layer and suitably printing and baking electrically conductive patterns and resistors on the surface of said insulating layer.

4,883,367

BEARING UNIT

Teruo Maruyama, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Apr. 28, 1988, Ser. No. 187,346
Claims priority, application Japan, Apr. 30, 1987, 62-106703
Int. Cl.[4] F16C *32/06*
U.S. Cl. 384—114 **5 Claims**



1. A bearing unit serving as a static pressure bearing comprising:

a bearing;

a shaft which rotates relative to said bearing and includes a plurality of shallow grooves on a surface thereof for generating a pumping pressure, at least one deeper circumferential groove formed in a circumferential direction of said surface, and an inner passage which is formed in the shaft

and communicates a part of said shallow groove with a part of said circumferential groove; and

a fluid held in a gap formed between said bearing and said shaft which forms a hydrodynamic lubrication film between said bearing and said shaft by relative rotation of said bearing and said shaft with a fraction of said fluid being circulated between said plurality of shallow grooves and said circumferential groove through said inner passage and said gap by said pumping pressure with said bearing unit less said circumferential groove serving as a dynamic pressure bearing.

4,883,368

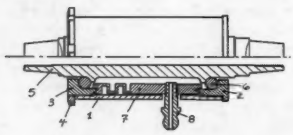
GREASE INJECTOR FOR BICYCLE CRANK BEARINGS

James A. Stein, 711½ Miller Valley Rd., Prescott, Ariz. 86301

Filed Dec. 8, 1987, Ser. No. 130,208

Int. Cl.[4] G05G *1/14;* **F01M** *11/04;* **F16C** *9/21, 33/66*

U.S. Cl. 384—458 **19 Claims**



1. Apparatus disposed intermediate bearing cups of opposed bearings within a bicycle crank bearing assembly for encircling a spindle supported by the bearings, said apparatus comprising in combination:

(a) a sleeve for encircling the spindle intermediate the opposed bearings;

(b) first means disposed at one end of said sleeve for sealingly engaging one of the bearing cups;

(c) second means disposed at the other end of said sleeve for sealingly engaging the other of the bearing cups;

(d) means for urging said first and second engaging means into sealing engagement with their respective bearing cups; and

(e) valve means for injecting a lubricant within said sleeve to force lubricant longitudinally within said sleeve and through the opposed bearings.

4,883,369

ROLL MOUNTING DEVICE WITH A COOLED BEARING

Daniel Jude, Villeneuve D'Ascq, France, and James T. Stull, Evans City, Pa., assignors to Dujardin Montbard Somenor, Seclin Cedex, France

Filed Mar. 25, 1988, Ser. No. 173,298

Claims priority, application France, Mar. 25, 1987, 87 04135

Int. Cl.[4] B22D *11/06;* **F16M** *1/00;* **F16C** *37/00, 23/06*

U.S. Cl. 384—476 **5 Claims**

1. A mounting device for a roll, which comprises

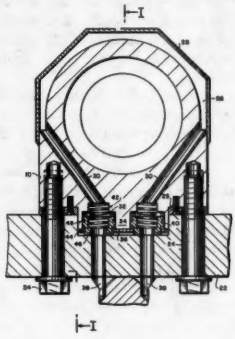
(a) a support means,

(b) a bearing means for the roll, the bearing means being affixed to the support means,

(1) the support means and the bearing means defining channels for the circulation of a cooling fluid therethrough, the support means and bearing means channels being in communication with each other across a plane of support of the bearing means on the support means through respective ends of the channels,

(c) a respective tubular element slidingly mounted in a seat at the end of each of said channels defined in one of said means, each tubular element having a cylindrical surface,

(d) a respective spring element biasing each tubular element outwardly from each one of said ends into contact with an opposite surface of the other one of said means, the tubular elements having ends maintained in contact with the opposite surface by the spring elements, and



(e) a respective fluid-tight gasket in the cylindrical surface of each tubular element providing a sliding fluid-tight seal between the tubular element and the seat.

4,883,370

ROTARY STRUCTURE

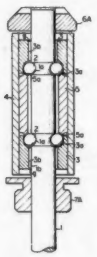
Tsutomu Nakanishi, Fujimidai-kunitachi, Japan, assignor to C.S.U. Ltd., Tokyo, Japan

Filed Jan. 27, 1987, Ser. No. 7,336

Claims priority, application Japan, Jan. 28, 1986, 61-11391[U]

Int. Cl.[4] F16C *43/06*

U.S. Cl. 384—490 **4 Claims**



1. A rotary structure for a VCR or floppy disc comprising a shaft having an outer periphery with an annular groove of substantially semi-circular cross-section therein, a ball engaging element around said shaft and having an end adjacent to said groove, an outer race comprising a ring surrounding said shaft and having an inner surface facing said shaft which is provided with a concave ball receiving groove therein of part circular cross-section, a plurality of spherical balls partly received in said annular groove in said shaft and projecting therefrom, said concave surface of said outer race being in contact with said balls to hold said balls rotatably in said annular groove in said shaft and in said ball-receiving groove in said outer race, and a bearing housing surrounding said outer race and fixedly supporting the same, said outer race having an end facing said end of said ball engaging element in spaced relation, said concave ball-receiving groove in said outer race extending to said end of said outer race, the spacing between said end of the outer race and said end of the ball engaging element being such that said ball engaging element can support said balls when freely inserted in said bearing housing during assembly

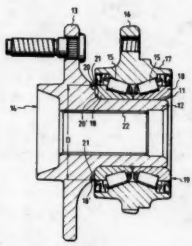
and enable said outer race to engage said balls and urge the same away from said ball engaging element and into said groove in said shaft, said housing having an open end in which said shaft is inserted, said end of said outer race facing inwardly into said housing in a direction away from said open end, said end of said ball engaging element facing in the direction towards said open end of said housing, said ball engaging element being fixed in said housing and said outer race being located between said ball engaging element and said open end of the housing, said end of said ball engaging member having a plurality of grooves receiving respective balls to hold the balls in spaced separated relation.

4,883,371

BEARING SYSTEM FOR A WHEEL

Masaaki Matsumoto, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Nov. 18, 1988, Ser. No. 272,852
Claims priority, application Japan, Nov. 19, 1987, 62-176672
Int. Cl.[4] F16C *19/38*
U.S. Cl. 384—559 **3 Claims**



1. A bearing assembly for a wheel of a vehicle, comprising:

a hub having a first flange portion for securing at one end either to the wheel or a support member of the vehicle, said first flange portion having a first predetermined diameter, said hub having an axially extending cylindrical portion with an outer peripheral surface of a second predetermined diameter less than the first diameter, forming a substantially radially extending wall adjoining the first flange portion, defining a shoulder portion with said first diameter;

a first member having an inner peripheral surface comprising a bearing seat engaging with the outer peripheral surface of the cylindrical portion;

a second member having a second flange concentrically mounted relative said first member for securing either to the wheel or the support member and not to said first flange; and

a separable double row anti-friction bearing, including rolling elements rotatably disposed between a circular outer race formed on an inner peripheral surface of the second member, and circular inner races formed on an opposing outer peripheral surface of the first member;

said first member having a radial dimension extending from the bearing seat at least substantially equal to the radial dimension of said wall;

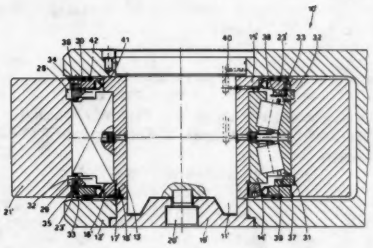
wherein at least one of the shoulder portion and the outer peripheral surface of the first member adjacent the shoulder has at least two notches for exposing radially extending surfaces of the hub and first member.

4,883,372

DEVICE TO CLAMP A ROLL ASSEMBLY HAVING A VERTICAL AXIS ON UNIVERSAL ROLLING STANDS

Fausto Drigani, Zugliano (UD), and Alfredo Poloni, Fogliano Di Redipuglia, both of Italy, assignors to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Filed Feb. 15, 1989, Ser. No. 310,652
Claims priority, application Italy, Mar. 4, 1988, 83332 A/88
Int. Cl.[4] F16C *19/38*
U.S. Cl. 384—585 **7 Claims**



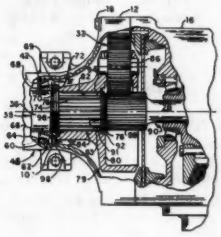
1. Clamping device for a rolling ring assembly (10') which has a vertical axis and comprises a rotation axle (11') fitted to a bearing block (12'), a jacket (13') secured to the rotation axle (11') and supported by an end support (19') cooperating with the axle (11') and a bearing (14') installed in cooperation with the jacket (13'), a rolling ring (21') that forms a rolling body being fitted to the bearing (14') by means of clamping means including a pair of flanges (23'), the device being characterized in that it comprises shoulder rings (30–31) consisting of at least one metallic elements capable of being inserted in circumferential grooves (28–29) which are substantially perpendicular to the rotation axle (11') and which are formed in the inner wall of the rolling ring (21'), the shoulder rings (30–31) projecting from the grooves (28–29) by a pre-determined distance and cooperating with the flanges (23') to clamp and keep in position the rolling ring (21') against the bearing (14').

4,883,373

MOUNTING ARRANGEMENT FOR A BEARING ASSEMBLY

Brent E. Rieke, Aurora, Ill., assignor to Caterpillar Inc., Peoria, Ill.

Filed Oct. 17, 1988, Ser. No. 258,532
Int. Cl.[4] F16C *19/38*
U.S. Cl. 384—585 **18 Claims**



1. A mounting arrangement for a bearing assembly, comprising:

a first member having a plurality of splines defined on a portion thereof;

means for fixedly positioning the bearing assembly on the first member;

a second member having a flange portion defined thereon and a plurality of splines formed therethrough, said second member being so constructed and arranged as to be positioned on the first member with the splines thereof in intermeshing engagement with the splines of the first member and at a location adjacent the positioning means with the flange portion in close proximity thereto to limit the movement of the positioning means and the bearing assembly; and

means for securing the position of the second member with respect to the first member.

4,883,374

THRUST BEARING ASSEMBLY

Thomas G. Rhoads, Thomaston, and Paul M. Cornish, Burlington, both of Conn., assignors to The Torrington Company, Torrington, Conn.

Filed May 3, 1988, Ser. No. 190,617

Int. Cl.[4] F16C *19/30*

U.S. Cl. 384—618 **1 Claim**

1. A thrust bearing assembly comprising:

a thrust bearing having at least one thrust washer having a radially-extending portion and an axial annular flange and a plurality of rollers adapted to roll along said radially-extending portion of said thrust washer;

an annular band having an axially-extending annular portion having a periphery engaging a periphery of said thrust washer flange of said thrust bearing; and

a selective thrust washer spacer having an annular configuration adapted to allow said spacer to be affixed to said band, said spacer having a radially inwardly extending annular lip, and said annular band having a radially outwardly extending annular flange, said flange being configured to cooperate with said lip of said spacer so as to hold said thrust bearing, said band, and said spacer together in a unitary thrust bearing assembly, said flange being configured to facilitate easy installation of said band into said spacer while providing a positive locking action which prevents the band from being pulled away from said spacer without damaging said band or said spacer.

4,883,375

PRINTING DEVICE

Yoshiyuki Karube, Aza-kuroishi, and Yuji Kawahara, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Continuation of Ser. No. 911,024, Sep. 24, 1986, abandoned. This application Apr. 12, 1989, Ser. No. 338,390

Claims priority, application Japan, Sep. 26, 1985, 60-214359

Int. Cl.[4] B41J *11/20, 13/04*

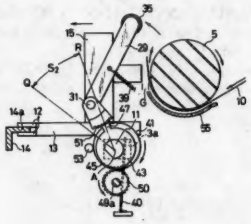
U.S. Cl. 400—55 **8 Claims**

1. In a printing device including a frame, a platen wound, on its peripheral surface, with a printing medium, a print head which defines a gap between the print head the the platen and is movable parallel to the platen, along a print line of the platen, so that the printing medium is printed as the print head moves, and medium holding means movable between a hold position in which the holding means holds the printing medium down on the platen, and a release position in which the holding means is off the platen, said printing device comprising:

drive means for moving the print head back and forth in a transverse direction, with respect to the print line of the platen, said drive means having an advance stroke, in which the print head is moved toward the platen, and retreat stroke, in which the print head is moved away from the platen; and

operative-transmission means operative for operatively connecting the drive means and the medium holding means so that the medium holding means is moved from the hold position to the release position, wherein:

said retreat stroke of said drive means including, at the start of the retreat stroke, a first stroke portion in which operation of said operative-transmission means is disabled and, subsequent to the first stroke portion, a second stroke



portion in which operation of said operative-transmission means is enabled;

said first stroke portion being allowed to an adjustment operation of said gap for regulating printing condition by said print head on the printing medium, thereby causing said adjustment operation of said gap to be done independently of the operation of said operative-transmission means;

said drive means includes a single reversible electric motor, adapted to provide the advance stroke by rotating in one direction, and to provide the retreat stroke by rotating in the other direction, said motor being stopped at the end position of the advance stroke and then rotating reversely, thus starting the first stroke portion of the retreat stroke; and

said gap adjustment operation being continued during said first stroke portion until said gap has a predetermined width.

4,883,376

DATA PROCESSING APPARATUS WITH CRT AND PRINTER

Takayuki Iwase, Chiryu; Minoru Sakanobe, Komaki, and Yuji Koga, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Dec. 30, 1987, Ser. No. 139,634

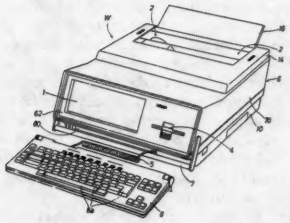
Claims priority, application Japan, Jan. 6, 1987, 62-808; Jan. 7, 1987, 62-1453

Int. Cl.[4] B41J *3/46*

U.S. Cl. 400—83 **11 Claims**

1. A data processing apparatus including a keyboard having a plurality of keys, a CRT display with an electron gun for displaying, on a picture plane, characters corresponding to keys operated on said keyboard, and an impact printer for printing data inputted from said keyboard on printing paper, said data processing apparatus characterized in that said apparatus has a body having upper, bottom, front and rear surfaces which is divided into a first portion including said front and bottom surfaces, and a second portion including said upper and rear surfaces, where said first portion includes said CRT dis-

play, the picture plane of which occupies most of said front surface of said first portion with the top of said picture plane slanting rearwardly, said second portion includes said impact



printer which is placed over the electron gun of said CRT display, and a shield plate is disposed between said first and second portions for shielding a magnetic flux generating from said impact printer.

4,883,377

CHARACTER PATTERN GENERATOR FOR DOT MATRIX PRINTER

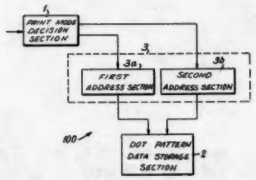
Hiroshi Takeda, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Continuation of Ser. No. 852,860, Apr. 16, 1986, abandoned. This application Apr. 6, 1988, Ser. No. 183,323

Claims priority, application Japan, Apr. 18, 1985, 60-82951

Int. Cl.[4] B41J *3/12, 19/32*

U.S. Cl. 400—121 **20 Claims**



1. A character pattern generator for a dot-matrix type printer having a print mode detector for detecting the fixed pitch or proportional pitch printing modes in accordance with an attribute code associated with a character code input from a host device, a momentary storage for storing the detection by the print mode detector, the character pattern generator outputting a character code signal corresponding to a fixed pitch or proportional pitch mode based on the result of the detection by the printing mode detector, comprising:

storage means for storing a plurality of first character characteristic dot pattern data for fixed pitch printing, and for storing a plurality of second character characteristic dot pattern data for proportional pitch printing only where the proportional pitch printing character characteristic dot pattern data corresponding to a character differs from the corresponding character's fixed pitch character characteristic dot pattern data and is not commonly used for printing the character in the fixed pitch and proportional pitch printing modes, said storage means being formed as a single ROM for storing the fixed pitch mode dot pattern data and the proportional pitch mode dot pattern data are intermixed;

first address location means for indicating the addresses of the fixed pitch character characteristic dot pattern data in the storage means in the fixed pitch mode;

second address location means for indicating the addresses of the character characteristic dot pattern data for proportional pitch printing in the storage means in the proportional pitch mode;

said character characteristic dot pattern data of said first address location means and of said second address location means indicating the address of a memory region wherein character patterns and symbol patterns for each respective mode are stored, information indicating the width of said pattern, and information indicating the size of blank portions adjacent said character and said symbol, said character characteristic dot pattern data being arranged so that when the character characteristic dot pattern of said proportional pitch mode and said fixed pitch mode are the same the address information has the same value; and

selection means coupled to the storage means and the first and second address location means for receiving a character code signal representative of a charaacter and an attribute signal representative of one of fixed pitch and proportional pitch printing modes and for supplying the character code signal to the first address location means or the second address location means in accordance with the attribute signal.

4,883,378

CONTROL SYSTEM FOR SHEET-FEEDING DEVICE FOR PRINTING APPARATUS

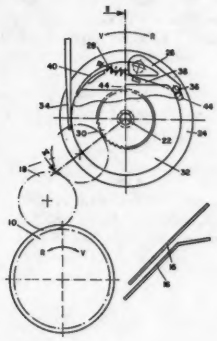
Helmut Steinhilber, Saline 29, 7210 Rottweil, Fed. Rep. of Germany

Division of Ser. No. 846,779, Mar. 26, 1986. This application Dec. 1, 1987, Ser. No. 132,812

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1985, 3512419

Int. Cl.[4] B41J *11/58, 13/10*

U.S. Cl. 400—624 **5 Claims**



1. A device for feeding individual sheets to the platen of a printing apparatus which incorporates a plurality of storage units each accommodating a stack of individual sheets, said device also incorporating separating means assigned to each storage unit engageable with the uppermost sheet of a respective stack in a respective storage unit, said device being driven by said platen and further incorporating selecting means for each storage unit driven by said platen to permit only the driving of the separating means of a selected storage unit, whereby each selecting means incorporates a driven engagement member and a switching means located at a given rotary distance from one position, which rotary distance differs for each storage unit and whereby said switching means guides said engagement member in one direction of rotation into an engagement position for establishing the driving connection for said separating means and in the opposite direction of rotation guides said engagement member beyond said engagement position, characterized by the provision of locking means

for each selecting means which in one direction of rotation lock and release said switching means and furthermore characterized by a counting device which, by addition or subtraction, counts or measures the line movement of said printing apparatus platen in forward or reverse directions and, after the number of line movements corresponds to the complete sheet-feeding and printing cycle, switches the locking device from the blocking position to the releasing position.

4,883,379

CORRECTION SHEET AND CORRECTION METHOD

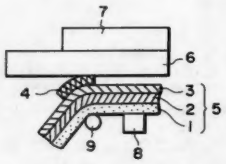
Tsuguhiro Fukuda; Hiroshi Sato, and Kazuhiro Nakajima, all of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 162,993

Claims priority, application Japan, Mar. 2, 1987, 62-048585; May 27, 1987, 62-131003

Int. Cl.[4] B41M *5/26*

U.S. Cl. 400—697.1 **8 Claims**



1. A correction sheet comprising an adhesive layer disposed on a support so that the adhesive layer develops an adhesive force on heating sufficient to adhere onto an erroneously recorded image on a recording medium and upon peeling to remove the erroneously recorded image from the recording medium; wherein the adhesive layer comprises a separation prevention layer comprising a thermoplastic resin having a glass transition temperature of −40° to 30° C. and an upper layer developing an adhesion on heating and containing a resin having a glass transition temperature of 60° C. or higher in a proportion of 1–25wt %.

4,883,380

LOTION APPLICATOR

Paul H. Ritterman, 5938 St. Mary's St., Baltimore, Md. 21207

Filed Sep. 26, 1988, Ser. No. 248,989

Int. Cl.[4] A45D *34/04*

U.S. Cl. 401—208 **1 Claim**

1. A lotion applicator apparatus for application of fluid to a surface of the human body comprising,

a housing means including a reservoir for replaceably storing a quantity of said fluid therein, and

a handle means pivotally mounted to said housing means for movement from a first position adjacent to said housing means to an extended second position extending outwardly of said housing means, and

latch means for securing said handle means in said extended second position, and

a semi-cylindrical sponge-like applicator member selectively positionable in said housing means for dispensing fluid from said reservoir to the human body, and

wherein said applicator member is reciprocatably mounted in said housing means and positionable from a first position retracted within said housing means to a second position extending outwardly of said housing means, and

wherein said applicator member includes a hemispherical form member positioned interiorly of said applicator member and spaced and secured to an axle wherein said axle is mounted for manual grasping from said first position to said second position, and

wherein said handle means includes a plurality of flanges orthogonally and integrally formed to sides of said handle means and nestable within recesses formed in said housing means, and

wherein said handle means includes a reduced terminal tip extending outwardly of said handle means between said flanges and positionable within a recess formed within a cap lid, and said cap lid is frictionally securable to an end of said housing means remote from the pivotal mounting of said housing means for securement of said housing means and simultaneously securing said handle means in said first position, and

wherein said axle extends outwardly of said housing means through either side thereof for manual grasping, and

wherein said latch means is slidably mounted on said housing means and is bifurcated at a forward end for engaging a pin orthogonally directed outwardly of said handle means, and

wherein said reservoir is accessible upon removal of a replaceable plug mounted within said housing means wherein said plug is underlying said handle means in said first position and exposed when said handle means is in said second position.

4,883,381

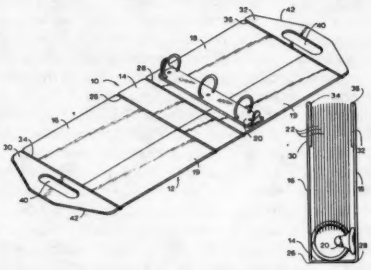
BOOK

Trudy Pisciotti, New Milford, N.J., and Dennis Healy, Baltimore, Md., assignors to Prentice Hall, Inc., Englewood Cliffs, N.J.

Filed Sep. 8, 1988, Ser. No. 241,706

Int. Cl.[4] B42F *1/00*

U.S. Cl. 402—74 **16 Claims**



15. A book configured for easy carrying, comprising:

a. a continuous cover of plastic including:

i. a spine;

ii. front and rear panels

iii. front and rear flaps, each of said flaps defining an aperture therethrough in the form of an elongated slot extending parallel to said spine configured and dimensioned to receive fingers;

said front and rear panels being connected to said spine along one panel edge by first foldlines and to said flaps along said remote panel edge by second foldlines, said first and second foldlines being parallel;

said panels being movable between a closed orientation wherein said panels are generally parallel and an open orientation wherein said panels are at least transverse;

said flaps tapering inwardly away from said second foldlines and being movable between a storage orientation and a carrying orientation, said flaps in said storage orientation being disposed intermediate said panels, overlying said panels without appreciably adding to the peripheral dimensions thereof, and extending substantially parallel to said panels generally towards said spine, said flaps in said carrying orientation extending generally outwardly from said panels and away from said spine, with both said flap apertures aligned to permit passage therethrough of fingers and thereby facilitate carrying of said book, said spine, said panels and said flaps being substantially sheet members; and

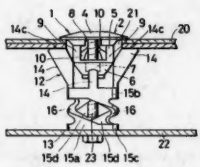
b. means fixed to said cover for securing paper intermediate said panels, said securing means being located adjacent the connection of said spine and one of said panels so as to avoid said securing means or the paper precluding movement of either of said flaps to said storage orientation.

4,883,382

MOUNTING MEMBER

Takashi Mushya, Kanagawa, Japan, assignor to Nifco, Inc., Kanagawa, Japan

Filed Nov. 29, 1988, Ser. No. 277,157
Claims priority, application Japan, Dec. 2, 1987, 62-184041
Int. Cl.[4] B25G *3/00*
U.S. Cl. 403—405.1 **13 Claims**



1. A mounting member for mounting a first member, having a mounting hole, upon a second member, with a stud secured thereto, such that said first member is spaced apart from said second member, comprising:

a stud holder section including a stem portion, having a head having a greater diameter than said mounting hole of said first member; and an inserting portion extending from said head, to be inserted through said mounting hole of said first member, and provided with securement means for securing a free end portion of said stud; and

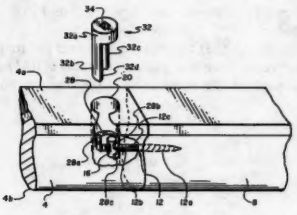
a spacer section including a stem portion having a plurality of legs for cooperating with said head of said stud holder section so as to clamp said first member therebetween, and a free end portion having a spring portion capable of being compressed when urged in a longitudinal direction by means of a biasing force and of elastically restoring to its initial non-compressed state when said biasing force is removed, said spacer section being capable of being penetrated by said stud and being interposed between said first and second members.

4,883,383

COMPONENT FASTENING SYSTEM

Brian Challis, No. 9 Northridge Way, Sandy, Utah 84092

Filed Jul. 15, 1988, Ser. No. 219,195
Int. Cl.[4] F16D *1/00*; F16B *5/00*
U.S. Cl. 403—407.1 **14 Claims**



1. Apparatus for fastening together in a mating relationship two articles having complementary, facing surfaces, wherein one of the articles has a cylindrical opening whose axis is generally parallel with said one article's facing surface, and a bore extending from the cylindrical opening to the facing surface ay an orientation generally perpendicular thereto, said apparatus comprising

an elongate shaft, one end of which is fixable in the facing surface of the other article so that the other end of the shaft projects generally perpendicularly therefrom to extend through the bore and into the cylindrical opening of said one article when the articles are placed with their facing surfaces together in a mating relationship, the other end of said shaft including a generally cylindrically-shaped element whose cylindrical axis is substantially perpendicular to the longitudinal axis of the shaft and is positioned to be generally parallel with the cylindrical axis of the opening,

an arcuate wedge means tapered from a thick back end to a narrower front end, the outer surface of the wedge means being shaped to generally conform to the side wall of the cylindrical opening to enable inserting the wedge means into the opening, and rotating the wedge means about the axis of the opening so that the wedge means moves, front end first, between the cylindrically-shaped element and adjacent side wall of the opening to increasingly urge the element away from the wall to thereby secure the two articles together, and

socket means comprising

a generally cylindrically shaped head having a tool receiving element to which a tool may be attached for causing rotation of the head, and

a generally semicylindrical skirt projecting downwardly from the head and having a leading edge and a trailing edge, said skirt being dimensioned to enable insertion thereof into the opening of said one article in registry with the wedge means so that as the head is rotated, the leading edge of the skirt engages the back end of the wedge means to cause the wedge means to rotate.

4,883,384

PROTECTIVE ROADWAY MARKER GUARD RAILS

Peter Hedgewick, Windsor, Canada, assignor to Pac-Tec, Inc., Newark, Ohio

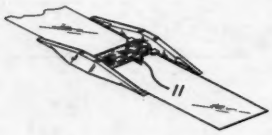
Filed Dec. 14, 1988, Ser. No. 284,127
Int. Cl.[4] G08B *1/00*
U.S. Cl. 404—14 **12 Claims**

1. A roadway pavement marker (**11**) protective member comprising; a guard rail (**10**) having two inclined ramps (**12*a*, 12*b***) aligned in a common plane, each inclined ramp (**12*a*, 12*b***) going from a lower end (**16*a*, 16*b***) to an upper end (**14*a*, 14*b***), a bridging surface (**18**) joins said upper ends (**14*a*, 14*b***), said

lower ends (16*a*, 16*b*) are at diametrically opposed ends of the guard rail (10),

a locating means (20) for locating said member with respect to a roadway surface having an upper locating end (22) and a lower locating end (24), said upper locating end (22) being substantially coincident with said guard rail (10) said lower locating end (24) being located between said guard rail (10) and a keel member (32), with an inclined ramp (26) extending between the upper (22) and lower locating ends (24),

positioning means (28) for positioning said protective member relative to both the pavement marker (11) and roadway surface characterized by first and second spaced



apart projections (30*a*, 30*b*), one projection (30*a*, 30*b*) being adjacent to each inclined ramp (12*a*, 12*b*) and opposite said locating means (20),

a keel member (32) having an upper end (34) and a lower end (36), said upper end (34) extending from the guard rail (10) to the lower end (36), said keel member (32) having a downwardly curved bottom surface (38),

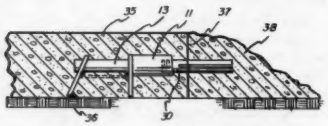
said protective member characterized by said guard rails (10) being secured in the roadway surface by said keel member (32) using only one slot in said roadway surface for placement of the protective member with the marker resting on the roadway surface and having an inclined surface to deflect oncoming objects from striking the pavement marker.

4,883,385

LOAD TRANSFER ASSEMBLY

Mark K. Kaler, Kettering, Ohio, assignor to Dayton Superior Corporation, Miamisburg, Ohio

Continuation of Ser. No. 182,273, Apr. 15, 1988, abandoned.
This application Apr. 20, 1989, Ser. No. 341,262
Int. Cl.[4] E01C *11/02*
U.S. Cl. 404—47 **11 Claims**



1. Apparatus for use in the construction of concrete pavement of predetermined thickness laid without stationary forms by a paving machine to transfer load lengthwise of said pavement across a predetermined vertical plane defined by the adjacent ends of two sections of said pavement laid at different times while providing for relative lengthwise movement of said pavement sections in use, comprising:

(a) a plurality of elongated coupling members each having a socket at the front end thereof,

(b) each of said coupling members having a straight cylindrical dowel releasably secured in said socket therein and projecting therefrom,

(c) means for attaching said coupling members together in spaced parallel relation with said front ends thereof defining a common vertical plane,

(d) means to be embedded in the first of said sections to be laid for supporting said attached coupling members on a roadbed with said coupling members and dowels defining a substantially horizontal plane aligned with a vertically intermediate location in said pavement and with said vertical plane defined by said coupling member ends extending substantially parallel with and in spaced relation with said predetermined vertical plane such that a portion of each of said dowels extends through said predetermined vertical plane,

(e) said supporting means being constructed and arranged to stand on said roadbed in spaced relation with said predetermined vertical plane and to support said dowels projecting therefrom in cantilevered fashion through said plane, and

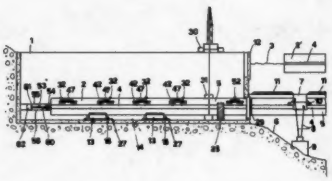
(f) said dowels being of a material susceptible to being readily cut off by a saw capable of cutting concrete whereby upon saw cutting said pavement along said predetermined vertical plane, the cut ends of said dowels will be exposed in the end of the resulting pavement section for removal from said coupling members and replacement thereof in said sockets by straight cylindrical dowels projecting from said pavement section for embedding in the next pavement section to be laid.

4,883,386

METHOD AND DEVICE FOR UNDERWATER MODULAR CROSSING CONSTRUCTION

Crescenzo Orlando, Sesto San Giovanni; Sandro Zenere, San Donato Milanese; Antonio Butera, Rome, and Leonardo Beghetto, Venice, all of Italy, assignors to Saipem S.p.A., Milan; Snamprogetti S.p.A., Milan; Spea S.p.A., Milan and Tecnomare S.p.A., Venice, all of, Italy

Filed May 11, 1988, Ser. No. 192,581
Claims priority, application Italy, May 15, 1987, 20531 A/87
Int. Cl.[4] E21D *10/14*
U.S. Cl. 405—136 **5 Claims**



3. An apparatus for making an underwater crossing using prefabricated modules which are sequentially butt-connected in a floodable assemblage basin until the bank opposite that of the assemblage basin is reached, comprising:

an adjustable support saddle on which the module comes to rest when the floodable basin is emptied, wherein said adjustable support saddle is positioned on the bed of the basin, and wherein said adjustable support saddle includes:

(a) a base axially moveable on the bed of the basin;

(b) wheels for moving said base;

(c) a ratiomotor for driving the saddles;

(d) hydraulic adjustment cylinders fastened to the sides of said base wherein pistons of said cylinders operate against rigid shoulders and guide structures fastened on the bed of the basin;

(e) vertically adjustable hydraulic cylinders attached to and supported by said base;

(f) a curvilinear structure positioned above said base having a fixed portion which is attached to said floodable assemblage and a movable portion which is circumferentially movable upon the surface of said fixed portion and wherein said movable portion is adapted to support the prefabricated module; and

(g) hydraulic cylinders hinged to said curvilinear structure

for causing the circumferential movement of said movable potion.

4,883,387

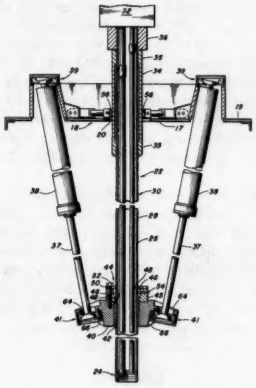
APPARATUS FOR TENSIONING A RISER

Roderick J. Myers, and Jorge H. Delgado, both of Houston, Tex., assignors to Conoco, Inc., Ponca City, Okla.

Continuation-in-part of Ser. No. 41,904, Apr. 24, 1987, which is a continuation-in-part of Ser. No. 936,579, Dec. 1, 1986, Pat. No. 4,733,991. This application Jun. 29, 1988, Ser. No. 212,801

Int. Cl.[4] E21B *43/01*

U.S. Cl. 405—195 **20 Claims**



1. Apparatus for resiliently interconnecting a substantially rigid riser with a deck of a floating production platform, said apparatus comprising

a plurality of riser tensioner cylinders each including a piston rod with a piston head connected thereto, said piston rod having a first length, and said riser tensioner cylinder having a second length, means for mounting said piston rod for movement within said riser tensioner cylinder;

means connecting each of said piston rods to said riser at an angle relative thereto;

spring means engaged between each said piston head and each said riser tensioner cylinder adapted to apply an upward tensioning force on said riser, wherein said spring means exert a non-linearly increasing force between said deck and said riser as relative motion between said deck and said riser increases, such that said first length of said piston and said second length of said cylinder may be significantly reduced thereby reducing the overall vertical distance between said platform deck and said means interconnecting said riser and said piston rod.

4,883,388

LOAD COMPENSATING SYSTEM

T. Dave Cherbonnier, 57 Kheam Hock Rd., Singapore, Hong Kong (1129)

Continuation-in-part of Ser. No. 783,679, Oct. 3, 1985, Pat. No. 4,662,786. This application Apr. 8, 1987, Ser. No. 35,784

The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.

Int. Cl.[4] E21B *7/12, 19/09*

U.S. Cl. 405—195 **19 Claims**

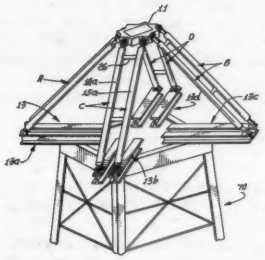
1. In a dynamic load compensating system, the combination comprising

(a) first structure to receive applied loading, and subject to displacement along a longitudinal path generally in the direction of load exertion,

(b) a base spaced from said structure, and

(c) means including pairs of generally parallel fluid actuator members pivotally connected to said base and to said structure for supporting said structure on the base, said members acting to resist said displacement of said structure characterized in that said base may move relatively toward and away from said structures while said loading continues to be applied to said structure,

(d) the actuator members of each pair being interconnected along their lengths between their pivotal connections to the base and said first structure so as to extend in and



remain in side by side parallel relation during actuation, said actuators including pistons and cylinders, the cylinders being directly interconnected proximate ends thereof from which the pistons emerge,

(e) there being two pairs of said actuator members, respectively at opposite sides of the path of said structure displacement, the actuators of each pair having like inclination to said path, and being inclined from vertical,

(f) and including side load resisting clevis devices pivotally connecting each of actuators at its opposite ends respectively to said structure and to said base.

4,883,389

METHOD FOR CONSTRUCTING HUGE MODULES, AND A MODULE FABRICATED BY SAID METHOD

Torodd E. Olsen, Haugesund, Norway, assignor to Haugesund Mekaniske Verksted A/S, Haugesund, Norway

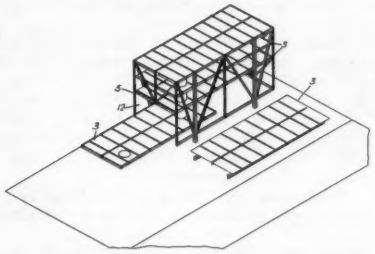
PCT No. PCT/NO87/00017, § 371 Date Nov. 2, 1987, § 102(e) Date Nov. 2, 1987, PCT Pub. No. WO87/05349, PCT Pub. Date Sep. 11, 1987

PCT Filed Mar. 6, 1987, Ser. No. 124,792

Claims priority, application Norway, Mar. 7, 1986, 860856

Int. Cl.[4] E02B *17/08*

U.S. Cl. 405—204 **11 Claims**



1. A method for constructing and assembling huge modules (1), particularly trusswork modules of steel for oil rigs operating at sea, wherein the completed module is defined by a sur-

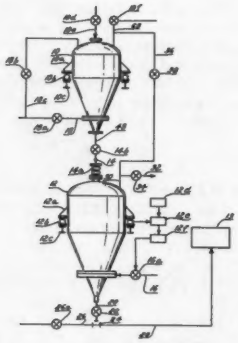
rounding module frame (2) comprising trusswork frames for side walls (5,6,7,8) and roof (4), and at least one deck structure (3) provided therein and secured to said module frame (2), characterized in that a first separately built deck structure (3) is introduced at floor level into said module frame (2), either through a temporary lower opening (12) in one of the side wall frames, or from below into a module frame lifted from floor level, and is properly positioned inside said module frame (2), and is then controllably elevated in said module frame (2) to a desired level, whereafter said deck structure (3) is secured to said module frame (2), and that this sequence is, if desired, repeated so that a second separately built deck structure is similarly introduced into said module frame (2), is properly positioned and elevated to a desired level underneath said first deck structure, and is then secured to said module frame, said sequence being repeated until the desired number of deck structures is installed, and that any lower opening (12) in said side wall frame(s) is then closed by providing trusswork braces (9).

4,883,390

METHOD AND APPARATUS FOR EFFECTING PNEUMATIC CONVEYANCE OF PARTICULATE SOLIDS

Harold Reintjes, Short Hills, and Sam Lampert, Upper Montclair, both of N.J., assignors to Petrocarb, Inc., Charlotte, N.C.

Filed Aug. 16, 1982, Ser. No. 408,634
Int. Cl.[4] B65G *53/66, 53/36, 53/38*
U.S. Cl. 406—24 **6 Claims**



1. Apparatus for effecting pneumatic conveyance of particulate solids comprising:

(a) container means having a lower part which comprises an inverted conical section,

(b) a double cone baffle mounted centrally within said container means composed of two cones each of which is smaller than said conical section and which are joined base to base and with an axis common to that of said container means with the wall of the lower cone of said double cone baffle being substantially parallel to the coextensive wall of said inverted conical section and forming an annular space therebetween,

(c) said container means having a solids charging inlet near its top and being adapted to hold gases at elevated pressures,

(d) means for introducing a gas into said annular space,

(e) means for controlling the pressure in said container means,

(f) means forming a mixing chamber under said container means with an inlet passageway connecting the bottom of said inverted conical section with the top of said mixing chamber, and said mixing chamber having a discharge passageway,

(g) means for supplying a controllable amount of gas to one side of said mixing chamber,

(h) a conduit system,

(i) means to conduct particulate solids pneumatically out of said discharge passageway of said mixing chamber and to said conduit system,

(j) supply means for supplying a predetermined amount of particulate solids to the upper zone of said container means during the period when said particulate solids are flowing from said mixing chamber into said conduit system without substantially influencing the pressure in said container means,

(k) means for controlled venting of gas from said container means during the periods when said supply means is supplying solid material to said container, and

(l) means for measuring the weight rate of solid material flowing from said container, including load cell means for generating a first signal decreasing in proportion to the weight of material measured by the load cell means;

(m) means for generating a second signal proportional to the desired weight rate of solid material flow from said container;

(n) means for comparing said first and second signals and determining the deviation therebetween; and

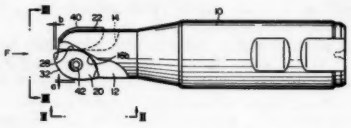
(o) said means for controlling pressure in said container means being responsive to the deviation between said first and second signals to produce a continuous flow of said particulate solids to said mixing chamber even during the period when said particulate solids are being supplied to the upper zone of said container means.

4,883,391

BALL END MILL

Osamu Tsujimura, Kawasaki; Tatsuo Arai, Kitamoto, and Masayuki Okawa, Kawasaki, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1988, Ser. No. 247,347
Claims priority, application Japan, Sep. 24, 1987, 62-145723[U]
Int. Cl.[4] B23B *27/06*
U.S. Cl. 407—40 **2 Claims**



1. A ball end mill comprising:

an end mill body including an axis of rotation therethrough and a recess formed in a forward end portion thereof and having a bottom face, said forward end portion having a bore formed therein and opening to said bottom face of said recess, said bore including a cylindrical bore portion disposed adjacent to said bottom face and an internally threaded portion extending coaxially from said cylindrical bore portion, said cylindrical bore portion being greater in diameter than said internally threaded portion;

an indexable cutter insert having a front face, a rear face and at least two convexly curved side faces lying between said front and rear faces, said insert having at least two convexly curved main cutting edges each defined by the intersection of a respective one of said convexly curved side faces with said front face, said insert having an aperture formed therethrough and extending generally perpendicular to said rear face, and insert being received in said recess with said rear face held in contact with said bottom face of said recess in such a manner that one of said

main cutting edges is indexed in a cutting position, said front face serving as a rake surface for said indexed main cutting edges; and

a clamp screw for releasably securing said cutter insert to said recess, said screw including an externally threaded portion and a cylindrical engaging portion disposed coaxially with said externally threaded portion and being greater in diameter than said threaded portion, said clamp screw passing through said aperture of said insert and being received by said bore in such a manner that said externally threaded portion is threaded into said internally threaded portion while said cylindrical engaging portion is held in engagement with said cylindrical bore portion;

said aperture having a larger diameter portion disposed adjacent to said front face, a reduced diameter portion disposed adjacent to said rear face and a tapered portion tapering from said larger diameter portion to said reduced diameter portion, said clamp screw having a head portion disposed adjacent to said cylindrical engaging portion and having a tapered portion tapering to said cylindrical portion, said head being received in said larger diameter portion of said aperture with said tapered portion held in abutment with said tapered portion of said aperture so that when said screw is tightened, said head portion presses said insert against said recess, said bottom face of said recess facing generally in the direction of rotation of said body, said recess having a generally arcuate side wall facing axially forwardly and radially outwardly of said end mill body, said insert being of a generally ellipsoidal shape having a pair of convexly curved side faces, the side face cooperating with said front face to define the other main cutting edge being held in abutment with said side wall.

4,883,392

FLY-CUTTER MILLING MACHINE

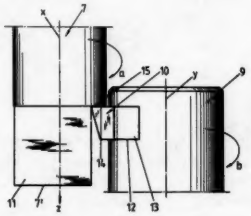
Karl Lieser, Wuppertal, Fed. Rep. of Germany, assignor to Wera Werk Hermann Werner GmbH & Co., Wuppertal, Fed. Rep. of Germany

Filed May 13, 1988, Ser. No. 193,875

Claims priority, application Fed. Rep. of Germany, May 30, 1987, 3718261

Int. Cl.[4] B23C *3/04*

U.S. Cl. 409—165 **4 Claims**



1. A fly-cutter milling machine for the simultaneous milling of a plurality of profiled structures having the form of grooves, surfaces and the like in rotating workpieces, the machine comprising:

a drive means for rotating a workpiece;

a rotating tool holder, and a fly cutter which protrudes radially outwards on the rotating tool holder;

a drive means for operatively rotating the cutter; and

control means connected to said cutter and workpiece drive means so that the cutter plunges via a plunge path through the cross section of the workpiece with a speed corresponding to the conditions of the fly-cutting, the cutter exiting the workpiece via an emerged path, speeds of rotation of tool holder and workpiece being in a ratio determined by a desired profiled structure, the speed of rotation of the fly cutter being different over the emerged path than over the plunge bath.

4,883,393

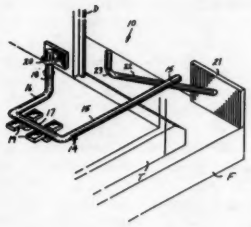
CARGO TRAILER SAFETY LOCK

William D. Acquaro, 268 Sackett Rd., Westfield, Mass. 01085

Filed Apr. 13, 1988, Ser. No. 181,169

Int. Cl.[4] B60P *1/00*

U.S. Cl. 410—52 **11 Claims**



1. A cargo trailer safety lock apparatus for use in combination with an elongate vehicular trailer positioned on a transport surface with said trailer formed with rearwardly positioned-doors pivotally mounted to said trailer for movement outwardly of said trailer, said apparatus comprising,

a latch bar pivotally secured to an underlying surface of said trailer proximate said trailer doors, and

said latch bar including a plurality of legs with a first elongate leg means extending linearly beyond said trailer doors for cooperation with a biasing bar integrally secured to a plate means secured to said transport surface, and

said latch bar including a second leg extending a distance parallel to said first elongate leg means, and

a third leg means integrally and angularly secured to said second leg for passage through an opening in said underlying surface of said trailer and through a latch member secured on an interior surface of one of said doors for securement of said doors.

4,883,394

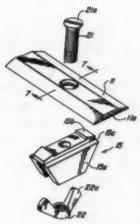
COVER WITH INTEGRAL FASTENING MEANS

Gerbrig W. Van der Woude, Rock Island, and Timothy M. Moore, Silvis, both of Ill., assignors to Polyco, Inc., Moline, Ill.

Continuation-in-part of Ser. No. 105,361, Oct. 7, 1987. This application Oct. 14, 1988, Ser. No. 258,751

Int. Cl.[4] F16B *13/06*; B44D *5/08*

U.S. Cl. 411—51 **1 Claim**



1. An expansion fastener for grates which is adapted to be supported from a hole in a cover member in such a manner as

to be inserted between the bars of a grate and manipulated so as to expand into engagement with the surfaces of the bars of said grate, said fastener including a "U" shaped channel member having two planar sides and the third side having a predetermined configuration and a hole therein, an externally threaded shaft with a manipulative head larger than the hole in said cover member inserted in said hole in said channel member;

a nut having a conical face with lateral extensions 180° apart threaded on said shaft;

said planar sides of said channel member expanding as said nut is rotated on and therefore restrained as said shaft is rotated to secure the channel member to the sides of said bars.

4,883,395

CONNECTING DEVICES FOR STRUCTURAL ELEMENTS

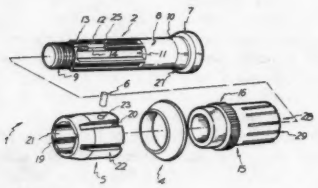
Dinko Klaric, South Melbourne, Australia, assignor to Space Display Systems Pty. Ltd., South Melbourne, Australia

Filed Dec. 29, 1987, Ser. No. 139,202

Claims priority, application Australia, Jan. 16, 1987, PH9909

Int. Cl.[4] F16B *13/06*

U.S. Cl. 411—55 **4 Claims**



1. A device for connecting two hollow tubular structural elements, a first one of said elements having a threaded opening and a second one of said elements having a cavity therein, comprising:

a bolt having a threaded end adapted to cooperate with the threaded opening of the first structural element, and a head end, said bolt increasing in thickness toward said head end;

a nut member disposed on said bolt and rotationally keyed so as to be adapted to rotate said bolt and to axially float on said bolt; and

a sleeve disposed between said nut member and said head end of said bolt, said sleeve being adapted to be force fitted into the cavity of the second structural element, said sleeve being at least partially deformable;

whereby upon sufficient rotation of said bolt in the threaded opening, said bolt contacts inwardly and expands at least a part of said sleeve outwardly to enhance the force fitting of said sleeve in the cavity.

4,883,396

DUAL EXPANSION AND NON-EXPANSION ANCHOR

Alfred A. Shamah, and James R. Schroeder, both of York, Pa., assignors to U.S.E. Diamond, Inc., York, Pa.

Continuation-in-part of Ser. No. 147,246, Jan. 22, 1988, Pat. No. 4,772,166. This application Aug. 15, 1988, Ser. No. 232,698

Int. Cl.[4] F16B *25/00, 13/06*

U.S. Cl. 411—55 **7 Claims**

1. A dual anchor comprising:

a. a screw-threaded connecting tie,

b. a first non-expansion fastener on said connecting tie at one end thereof,

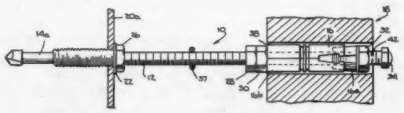
c. a second expansion fastener on said connecting tie at the opposite end thereof;

d. a wedge nut of said second expansion fastener mounted on, but free from threaded engagement with, said connecting tie,

e. first stop means on said connecting tie engaging a structural member for said first non-expansion fastener,

f. said first non-expansion fastener being rotatable when the connecting tie is rotated to insert it into said structural member and secure it thereto,

g. second stop means on said connecting tie engaging an expansion sleeve of the second expansion fastener,



h. an additional nut threaded to said connecting tie,

i. said additional nut abutting the wedge nut of the second expansion fastener, and

j. the expansion sleeve of the second expansion fastener being expandable when the additional nut is rotated relative to the connecting tie to drive said wedge nut of the second expansion fastener against said expansion sleeve.

4,883,397

U-SHAPED FASTENING CLIP DEVICE WITH RESILIENT TONGUE MEMBER

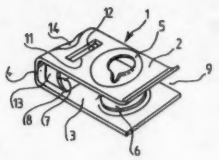
Dominique Dubost, Saint Cloud, France, assignor to RAPID S.A., Paris Cedex, France

Filed Feb. 15, 1989, Ser. No. 310,871

Claims priority, application France, Feb. 24, 1988, 88 02241

Int. Cl.[4] F16B *37/04;* B42F *1/02*

U.S. Cl. 411—174 **6 Claims**



1. A resiliently deformable U-shaped fastening clip adapted to be clipped onto the edge of an article, the clip comprising:

two resilient legs;

a portion connecting the two resilient legs to one another;

a resilient tongue, the tongue member comprising a first end integrally connected to a first one of the two legs and a second end which is free, the tongue extending between the two legs for maintaining the two legs in a spaced apart position before the clip is clipped onto the article and for allowing the two legs to remain in a closed position after being clipped onto the article;

a tongue member receiving portion formed in the second one of the two legs;

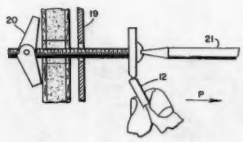
the free end of the tongue member contacting the second leg to maintain the two legs in a spaced apart position before the clip is clipped onto the article and the free end being movable to a position in which the tongue is received in the tongue member receiving portion of the second leg so as to allow the two legs to remain in a closed position after being clipped onto the article.

4,883,398

TOGGLE BOLT INSTALLATION, HARDWARE, AND MANUFACTURE

Edward H. Duncan, Avonmore, Pa., assignor to Daniel A. Sullivan, Jr., New Kensington, Pa., a part interest

Filed Jun. 10, 1987, Ser. No. 60,327
Int. Cl.[4] F16B *21/00*
U.S. Cl. 411—344 1 Claim



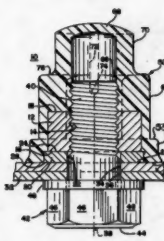
1. In combination with a toggle bolt, a means for exerting a pull on the bolt of the toggle bolt, for maintaining contact of its wings with the inner surface of a wall until the bolt has been tightened, said means comprising a washer dimensioned for permitting exertion of pull at final tightening, said washer being rigid and having an inclined tab, the tab having a joint with the washer of reduced cross section permitting the tab to be broken off.

4,883,399

PLASTIC ENCAPSULATED NUT AND WASHER ASSEMBLY

Barry L. MacLean, Libertyville, Ill., assignor to MacLean-Fogg Company, Mundelein, Ill.

Filed Dec. 5, 1988, Ser. No. 280,140
Int. Cl.[4] F16B *19/00, 33/00, 37/14*
U.S. Cl. 411—431 20 Claims



1. A fastener assembly comprising:

a nut having a face and a threaded bore intersecting said face;

a washer abutting said face having a central bore aligned with said threaded bore; and

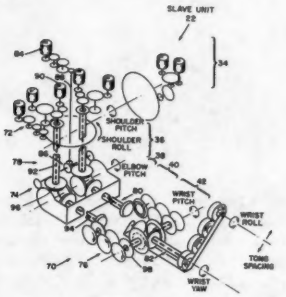
a body of plastic material permanently molded on said nut and encapsulating at least a portion of said nut and washer for retaining said washer in abutting relation to said face of said nut with said bore exposed to receive a threaded element engaging said threaded bore of said nut, said plastic body having an external surface for receiving tool means for turning said nut while threadedly engaging said threaded element.

4,883,400

DUAL ARM MASTER CONTROLLER FOR A BILATERAL SERVO-MANIPULATOR

Daniel P. Kuban, Oak Ridge, Tenn., and Gerald S. Perkins, Altadena, Calif., assignors to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

Filed Aug. 24, 1988, Ser. No. 236,068
Int. Cl.[4] B25J *9/08*
U.S. Cl. 414—2 7 Claims



6. A master controller for controlling a slave servo-manipulator, comprising:

at least one manually manipulative arm including a shoulder joint, an upper arm member extending from said shoulder joint, a forearm member, an elbow joint operative between a proximal end portion of said forearm member and said upper arm member, means for actuating a tong arrangement of the slave servo-manipulator, and a wrist joint operative between a distal end portion of said forearm member and said actuating means;

a plurality of motors located adjacent one another at said shoulder joint;

means for transmitting the output of said motors to said members through said joints, said transmitting means including sheaves located at said joints and a plurality of cables within said members extending between said joints and engaging said sheaves, said sheaves having diameters so as to provide a torque cross-coupling that substantially duplicates the torque cross-coupling in the corresponding slave joints;

said sheaves also providing positional cross-coupling between adjacent joints of said master controller that substantially duplicates the positional cross-coupling between corresponding joints of the slave servo-manipulator.

4,883,401

ARTICLE HANDLING APPARATUS FOR THE STORAGE AND DELIVERY OF PLURAL TYPES OF ARTICLES

Shelden M. Kavieff, Farmington Hills, Mich., assignor to Jervis B. Webb Company, Farmington Hills, Mich.

Filed Oct. 21, 1988, Ser. No. 260,734
Int. Cl.[4] B65G *1/06*
U.S. Cl. 414—273 5 Claims

1. Article handling apparatus comprising:

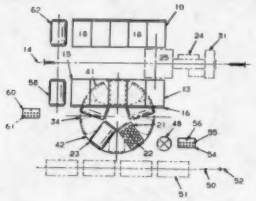
a rack structure having opposite sides and vertical rows of compartments extending transversely of said sides; each compartment being adapted to contain an article;

a storage and retrieval machine mounted for movement along one side of said rack structure, said machine including a vertically movable carriage, and article handling means on said carriage operable to place an article in or remove an article from a selected one of said compartments;

an indexable turntable having an axis of rotation and a plurality of article supports spaced radially and circumferentially relative to said axis;

means for mounting said turntable with the axis thereof disposed vertically and with peripheral portions thereof

extending into and projecting from the other side of said rack structure whereby in response to indexing movements of said turntable each of said article supports is selectively positionable within said rack structure so as to form a transfer compartment accessible by said storage



and retrieval machine; and control means connected to said storage and retrieval machine and to said turntable for correlating the respective movements thereof whereby articles are selectively transferable between said compartments and said article supports of said turntable.

4,883,402

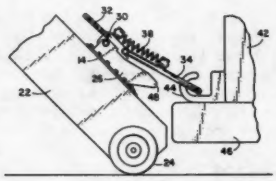
COUPLING SYSTEM FOR DROP BOX

Fredrick R. Wyss, Newberg, Oreg., assignor to Force Northwest Distributors, Inc., McMinnville, Oreg.

Continuation of Ser. No. 874,213, Jun. 13, 1986, Pat. No. 4,764,080. This application May 23, 1988, Ser. No. 197,593

Int. Cl.[4] B60P *1/64*

U.S. Cl. 414—499 **3 Claims**



1. A drop box loading system comprising:

(a) a drop box having an upwardly opening hook located at its front end;

(b) an elongate hoist frame having an upper portion with a track defined therein;

(c) an endless chain which is rotatably mounted on said frame;

(d) means for moving said chain in either direction along the elongate axis of said frame;

(e) a carriage which is attached to said chain;

(f) said carriage including means for moving it along said track as said chain is moved;

(g) a bail attached to said carriage, having a tip which extends toward one extremity of said frame;

(h) a stop, located on said frame, which prevents movement of said carriage past a certain point towards said one extremity of said frame;

(i) said carriage including lifting means for raising said tip above said hook whenever said chain continues to urge said carriage towards said one extremity of said frame after said carriage has engaged said stop; and

(j) said carriage further including means for orienting said carriage and said bail so that said bail drops back onto said hook when said carriage is pulled free from said stop.

4,883,403

IMPELLERS FOR CENTRIFUGAL PUMPS

Craig I. Walker, Artarmon, Australia, assignor to Warman International Limited, New South Wales, Australia

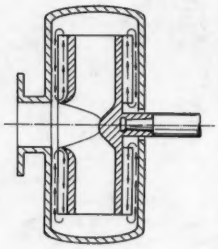
PCT No. PCT/AU87/00334, § 371 Date Aug. 5, 1988, § 102(e) Date Aug. 5, 1988, PCT Pub. No. WO88/02820, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 2, 1987, Ser. No. 239,959

Claims priority, application Australia, Oct. 7, 1986, PH8368

Int. Cl.[4] F01D *5/26, 5/34*

U.S. Cl. 415—98 **8 Claims**



1. A centrifugal slurry pump impeller comprising:

auxilliary vanes located on at least one side surface thereof;

an annular projection joining the outer ends of the auxilliary vanes at or adjacent the periphery of the impeller; and

at least one further projection extending between adjacent auxilliary vanes and spaced substantially from both ends of the adjacent auxilliary vanes to form pockets intermediate said adjacent auxilliary vanes with said annular projection.

4,883,404

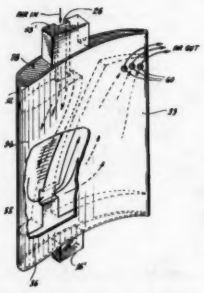
GAS TURBINE VANES AND METHODS FOR MAKING SAME

Alden O. Sherman, 85 Weston Rd., Weston, Conn. 06883

Filed Mar. 11, 1988, Ser. No. 166,687

Int. Cl.[4] F01D *5/18*

U.S. Cl. 415—115 **20 Claims**



1. A gas turbine vane that is adapted to have fluids pass therethrough comprising

a support member

and a cover member having outer surfaces of predetermined configuration for a gas turbine vane,

said cover member being retentively positioned on said support member by having been bonded to said support member at locations other than those at which the hereinafter-described passageways and chambers have been formed,

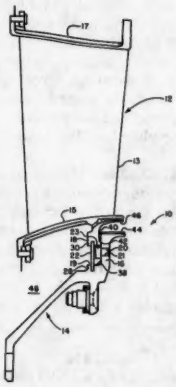
the outside surfaces of said support member being so configured and dimensioned that, together with the inside surfaces of said cover when said cover is so positioned on said support member, passageways and chambers of predetermined size, shape, configuration and location are formed for fluid to pass through as it passes through said vane.

4,883,405

TURBINE NOZZLE MOUNTING ARRANGEMENT

Alan Walker, Wyoming, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Nov. 13, 1987, Ser. No. 122,142
Int. Cl.[4] F01D *9/04*
U.S. Cl. 415—137 **14 Claims**



1. A turbine nozzle and nozzle support assembly comprising:
a turbine nozzle mounting flange affixed to the turbine nozzle;
a nozzle seating flange forming a part of the nozzle support, said nozzle seating flange supporting the turbine nozzle at said mounting flange;
pins engaging said turbine nozzle mounting flange and said nozzle support in order to affix said turbine nozzle to said nozzle support at said nozzle seating flange; and
retainer strips engaging said pins and said nozzle support in order to maintain said pins in engagement with said turbine nozzle mounting flange and said nozzle support, said retaining strips being held within a retention flange of said nozzle support.

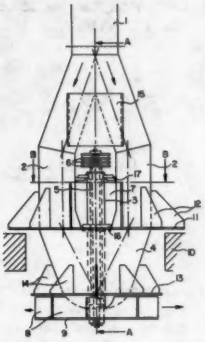
4,883,406

TRANSPORT VENTILATOR

Johann Arnold, Mühlematttweg 3, CH-6374 Buochs, Switzerland

PCT No. PCT/CH88/00037, § 371 Date Oct. 14, 1988, § 102(e) Date Oct. 14, 1988, PCT Pub. No. WO88/06240, PCT Pub. Date Aug. 25, 1988
PCT Filed Feb. 16, 1988, Ser. No. 279,154
Claims priority, application Switzerland, Feb. 17, 1987, 582/87
Int. Cl.[4] F04D *29/52*
U.S. Cl. 415—183 **5 Claims**

1. A transport ventilator for moving air or for transporting loose material, the transport ventilator comprising: a fan-blade wheel, a drive motor, an inlet suction pipe, said inlet suction pipe bifurcated upstream of said fan-blade wheel forming two separate pipes, said two separate pipes having a first cross-sectional area at least equal to a second cross-sectional area of said inlet suction pipe, said bifurcated pipes discharging into an expanded opening of a common cone, said fan-blade wheel arranged on an outlet side of said cone, a drive shaft of said fan-blade wheel extending axially outwards in an area between



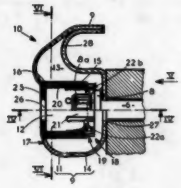
said bifurcated pipes, and said drive shaft driven by a drive motor located outside said bifurcated pipes.

4,883,407

SCREWED ATTACHMENT OF A BODY OF REVOLUTION TO AN ANNULAR FLANGE IN A TURBINE ENGINE

Eric Touze, Le Mee Sur Seine, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "SNECMA", Paris, France

Filed Dec. 16, 1988, Ser. No. 285,583
Claims priority, application France, Dec. 16, 1987, 87 17547
Int. Cl.[4] F04D *29/60*
U.S. Cl. 415—190 **9 Claims**



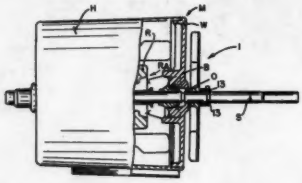
1. Attachment means for fixing a body of revolution to an annular flange in a turbine engine, comprising a plurality of evenly distributed screws, each of said screws having a head, an annular fairing forming a bolt guard over the heads of said screws, said bolt guard having means defining access holes to said screws in the face of said bolt guard opposite said screws, a plurality of first tubular sockets within said bolt guard and respectively aligned with said screws, said first sockets being wider than the heads of said screws and having first and second ends, said first ends being rigidly fixed to said bolt guard in the region of said access holes, and said second end of each of said first sockets having at least one notch-like cut-out, and a plurality of second tubular sockets respectively disposed within said first sockets, each of said second sockets having its inner end formed with at least one lug cooperating with said cut-out of the respective first socket, and at least one second lug curved inwardly and cooperating with the head of the respective screw in such a way as to prevent rotation of said screw.

4,883,408

MOTOR FAN RETENTION ON A NON-STEPPED SHAFT

Gary W. Borcherding, St. Louis County, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Oct. 7, 1988, Ser. No. 255,838
Int. Cl.[4] B63H *1/20*
U.S. Cl. 416—93 R 7 Claims



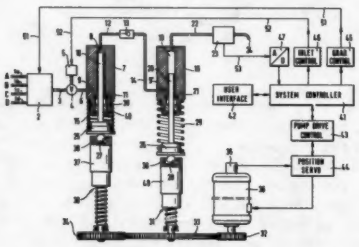
1. In a dynamoelectric machine comprising a housing, and a rotor assembly including for at least a portion its axial length a rotatable generally uniform diameter shaft, an outer end of the shaft projecting through an opening in an end wall of the housing, said shaft having a circumferential groove formed in it, the improvement comprising a fan for moving air through the machine to ventilate the machine and keep it cool, means for securing the fan to the shaft, said securing means including a hub integrally formed with said fan, said hub having an axial opening in it for receiving said shaft, a plurality of tabs formed in said hub, at least one of said tabs having a projection extending radially inwardly therefrom, said projection snap fitting into said groove to locate said fan on said shaft, and a retention ring fitted over the outer surface of said hub and exerting sufficient compressive force on said at least one of said tabs to retain said at least one of said tabs in said groove when said shaft is rotating during normal motor operation.

4,883,409

PUMPING APPARATUS FOR DELIVERING LIQUID AT HIGH PRESSURE

Fred Strohmeier, Ringstrasse 58, D-7587 Rheinmunster 2, and Klaus Witt, Quellenstrasse 16, D-7538 Keltern 3, both of Fed. Rep. of Germany

Filed Sep. 19, 1988, Ser. No. 246,479
Claims priority, application European Pat. Off., Sep. 26, 1987, 87114091.9
Int. Cl.[4] F04B *41/06*
U.S. Cl. 417—43 12 Claims



1. Pumping apparatus for delivering liquid at a high pressure, comprising:

a. a first piston (10) for reciprocation in a first pump chamber (7), the first pump chamber having an inlet port (9) and an outlet port,

b. a second piston (20) for reciprocation in a second pump chamber (18), the second pump chamber having an inlet port (9') and an outlet port,

c. a conduit connection (12,14) between the outlet port of the first pump chamber and the inlet port of the second pump chamber,

d. an inlet valve (4) connected to the inlet port of the first pump chamber for allowing flow of liquid into the first pump chamber and for inhibiting flow in the opposite direction,

e. an outlet valve (13) connected to the outlet of the first pump chamber for allowing flow of liquid into the second pump chamber and for inhibiting flow in the opposite direction,

f. drive means (30,34; 31,33; 32,36) for reciprocating the first and the second piston, comprising ball-screw spindles (30,31) coupled to each of said pistons (10,20), respectively, and said drive means for each piston further comprising:

an actuating element (37) having a recess (38) for receiving a ball (27),

a ball (27) having such a diameter that it projects above the recess (38), but can freely move inside the recess,

a piston holder (25) to which the piston (10) is mounted having a surface for contacting the ball (27),

a return spring (15) for exerting a force on the piston (10) in a direction away from the pump chamber (7), and a guiding element (39) arranged between the actuating element (37) and the pump chamber (7) for guiding the piston (10), and

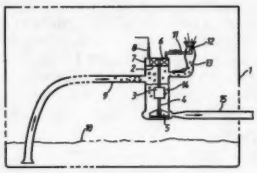
g. control means (41,42,43,44,35) coupled to the drive means (30,34; 31,33; 32,36) for adjusting the stroke lengths of the pistons (10,20) between their top dead center and their bottom dead center, respectively, thereby permitting an adjustment of the amounts of liquid displaced by the first and second piston, respectively, during a pump cycle such that pulsations in the flow of the liquid delivered to the output of the pumping apparatus are reduced.

4,883,410

FUEL SUPPLY SYSTEMS

John Goddard, and Peter Taylor, both of Hampshire, England, assignors to Plessey Overseas Limited, Ilford, England

Filed Jan. 17, 1989, Ser. No. 297,365
Claims priority, application United Kingdom, Jan. 18, 1988, 8801037
Int. Cl.[4] F04C *19/00*
U.S. Cl. 417—69 6 Claims



1. A liquid fuel pump arrangement for delivering liquid fuel to an engine comprising a liquid-ring pump including a motor-driven bladed impeller rotor which is located eccentrically within a cylindrical bore of a chamber forming part of a hollow pump body structure so that during rotation of the impeller rotor the blade tips thereof come into close proximity with the cylindrical wall of said bore at one position only, the hollow pump body structure also accommodating a motor-driven prime pump impeller which pumps fuel within the pump body structure to an aircraft or other engine, in which an inner end wall of the liquid ring pump provides the liquid ring with access to the liquid fuel within the hollow pump body structure whilst an outer end wall of the liquid ring pump has an air/-vapour inlet port through which the bladed impeller of the liquid ring pump during rotation thereof draws air/vapour and an air/vapour outlet port the flow of air/vapour expelled therefrom by compression of the air/vapour within the liquid-

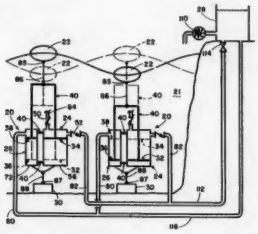
ring in response to rotation of the bladed impeller being restricted by flow the restriction means in order to build up static pressure within the liquid ring to a level preventing boiling of the liquid within the ring which could cause vapour blockage of the pump.

4,883,411

WAVE POWERED PUMPING APPARATUS AND METHOD

Tom J. Windle, 3500 Southeast Washington Blvd., Bartlesville, Okla. 74006

Filed Sep. 1, 1988, Ser. No. 239,618
Int. Cl.[4] F04B *17/00*; F03B *13/12*
U.S. Cl. 417—331 **31 Claims**



2. A method of pumping fluid using energy from rising and falling wave action in a body of fluid comprising:

connecting a primary pumping means between a float and anchor in a body of fluid;

connecting a secondary pumping means between a float and an anchor in a body of fluid;

pumping fluid with the primary pumping means as the float rises with rising wave action;

pumping fluid into a fluid container extending above the primary and secondary pumping means with the secondary pumping means as the float rises with rising wave action;

exerting reloading pressure on the secondary pump with the fluid in the fluid container in opposition to the buoyancy of the float;

using the reloading pressure to reload the secondary pump as the float falls with falling wave action; and

interconnecting the primary pumping means and the secondary pumping means so that the primary pump is reloaded as the secondary pump is reloaded.

4,883,412

VARIABLE CAPACITY DIAPHRAGM PUMPS

Max A. Malizard, Saint Remy L'Honore, and Jean C. Degremont, Vascoeuil, both of France, assignors to Dosapro Milton Roy, Pont-Saint-Pierre, France

Continuation of Ser. No. 873,474, Jun. 11, 1986, abandoned, which is a continuation of Ser. No. 689,794, Jan. 8, 1985, abandoned. This application Jul. 27, 1987, Ser. No. 77,983
Claims priority, application France, Jan. 11, 1984, 84 00343
Int. Cl.[4] F04B *43/06*
U.S. Cl. 417—387 **1 Claim**

1. In a variable capacity diaphragm pump in which the diaphragm defining pumping chamber is actuated hydraulically by a liquid contained in a displacement chamber, said variable capacity diaphragm pump comprising:

a piston actuated by reciprocating movement with fixed stroke moves;

said piston having a front end, a back end and an axis, said piston being hollow and presenting in the vicinity of the back end radial orifices;

an outer ring mounted around and adjustably mounted along said back end and being positioned to shut off said radial orifices during part of the stroke, the orifices opening into a reserve chamber at atmospheric pressure during another part of the stroke;

guide means for guiding the front end of said piston over substantially less than the axial length of said piston;

said piston being driven in a reciprocating movement by a circular eccentric cooperating with two opposed surfaces secured to said piston;

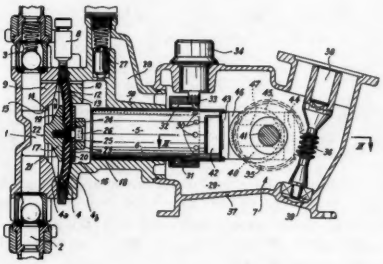
said eccentric being integral with the gear of a speed reducing gear pair defining an eccentric/wheel assembly;

the reducing gear pair including a gear and screw;

a stationary shaft perpendicular to and having an axis passing through the axis of said piston, said eccentric/wheel assembly being mounted on said shaft to rotate thereon;

said piston terminating in an integral U-shaped shank spaced axially outwardly of said radial orifices;

said shank defining a pair of wings having said opposed



surfaces on which said eccentric bears, said opposed surfaces being perpendicular to and spaced apart axially along the piston axis, said opposed surfaces being spaced apart by a length slightly greater than the diameter of said eccentric;

said shank including a base extending between said wings and perpendicular to said fixed shaft;

said base having a longitudinal groove parallel to the axis of said piston;

said stationary shaft extending through said groove, said groove having a width slightly greater than the diameter of said stationary shaft to permit free axial movement of said piston relative to said stationary shaft; and

said groove and said stationary shaft supporting and guiding the back end of said piston to provide reduced length of said guide means for the front end of said piston and to minimize forces on said piston in a direction transverse to the piston axis.

4,883,413

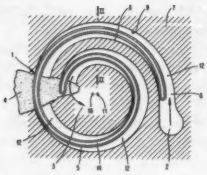
ROTARY SPIRAL PISTON DISPLACEMENT MACHINE HAVING A SILICON RUBBER BIASED SEAL

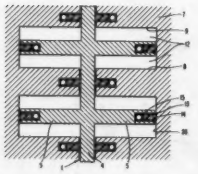
Josef Perevuznik, Fialisbach; Fritz Spinnler, Arisdorf, and Jürg Weber, Birmenstorf, all of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Filed Jul. 1, 1988, Ser. No. 214,340
Claims priority, application Switzerland, Jul. 10, 1987, 2638/87
Int. Cl.[4] F04C *18/04, 27/00*; F16F *1/36*; F16J *15/48*
U.S. Cl. 418—55 **3 Claims**

1. A rotary-piston displacement machine for compressible media, comprising at least one deliver space which is defined by spiral-shaped peripheral walls, extending axially from a side wall, and leads from an inlet to an outlet, and includes a spiral-shaped displacement body which protrudes into the delivery space and is mounted with respect to the delivery space for executing a circling, torsion-free motion, the displacement body having a center offset eccentrically relative to a center of

the peripheral walls in such a way that the displacement body always touches both an outer and inner wall defining the peripheral walls of the delivery space at at least one advancing contact point each, wherein end faces of the displacement





body which adjoin the side wall are provided with a groove in which an elastic and slidable material sealing strip is inserted, and a spring element is arranged between a root of the groove and an underside of the sealing strip, the spring element being a tube of silicone rubber.

4,883,414

ROTATING PISTON COMPRESSOR

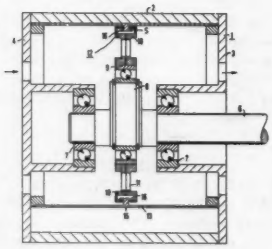
Hans-Peter Schabert, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 22, 1988, Ser. No. 171,653

Claims priority, application Fed. Rep. of Germany, Mar. 23, 1987, 3709493; Aug. 19, 1987, 3727697

Int. Cl.[4] F04C *18/356, 27/00*

U.S. Cl. 418—57 **40 Claims**



1. Rotating piston compressor, comprising a cylinder, a thin-walled radially resilient piston contacting said cylinder at a given location and having a circular cross section, a surface facing said cylinder and a surface facing away from said cylinder, a rotationally symmetrical radial support engaging said surface of said piston facing away from said cylinder, said support and said piston having local play therebetween at said given location, and a drive shaft connected to said support for eccentrically moving said support and said piston, said drive shaft having an eccentricity being greater than one-half the difference between the diameters of said cylinder and said piston.

4,883,415

PRESS FOR TIRES AND AUTOMATIC DEVICE FOR RAPIDLY DISMOUNTING THE RELATIVE VULCANIZING MOLD

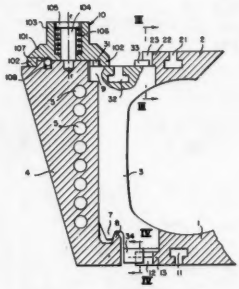
Bruno Salvadori, Cormano, Italy, assignor to Pirelli Coordinamento Pneumatici S.p.A., Milan, Italy

Filed Nov. 24, 1987, Ser. No. 124,966

Claims priority, application Italy, Dec. 1, 1986, 22515 A/86

Int. Cl.[4] B29C *33/04, 35/00*

U.S. Cl. 425—47 **10 Claims**



1. A segmented vulcanizing mold for elastomeric or plastomeric toroidal articles, mountable and detachable from a press-frame, comprising:

a first cheek and a second cheek being axially opposed to each other; said first cheek and said second cheek delimit the flanks of an article to be molded;

a crown of radially contractile and expansible sectors interposed between said first cheek and said second cheek which delimits a radially outer surface of the article to be molded, said crown of radially contractile and expansible sectors being contained in a holder ring solidly locked to said press-frame and the sectors comprising two connected pieces wherein a first connected piece is a matrix having a radially inner surface substantially corresponding to a portion of the crown surface of the article to be molded, and a second connecting piece is a support for the matrix having a radially outer surface inclined with respect to an axis of the mold, the matrix being freely movable with respect to a corresponding support in at least the axial direction along the mating surfaces between said matrix and said support; said support and a corresponding matrix therefor being operatively associated with one another through at least one fixing device that is alternatively shiftable between two operative positions, a first operative position being a working position wherein the matrix is solidly locked on the support and a second operative position being a rest position wherein the matrix and the support are freely movable with respect to one another.

4,883,416

SLIP-FORM CASTING MACHINE FOR FABRICATION OF ELONGATED CONCRETE PRODUCTS

Hannu Tomminen, Nurmijärvi, Finland, assignor to Parma Oy, Forssa, Finland

Filed Jun. 15, 1988, Ser. No. 207,168

Claims priority, application Finland, Jun. 18, 1987, 872740

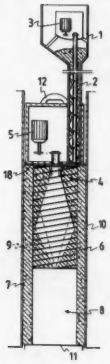
Int. Cl.[4] B28B *1/26*

U.S. Cl. 425—64 **4 Claims**

1. A slip-form casting machine for fabrication of elongated concrete products, comprising:

a casting mold which defines an elongate cavity and has first and second opposite ends, the mold being plugged at its first end,

a casting machine body of which the external cross-sectional form is substantially complementary to the cross-sectional form of the cavity defined by the mold, the casting machine body being positioned inside the cavity and being movable therein longitudinally of the cavity, and having a first side directed towards the first end of the mold and a second side directed away from the first end of the mold,



an auger positioned in the mold cavity between the first side of the casting machine body and the first end of the mold, the auger being supported by the casting machine body and being rotatable relative to the mold, and

means for feeding concrete into the mold cavity between the auger and the first side of the casting machine body, whereby the auger exerts pressure on the concrete as the auger rotates.

4,883,417

APPARATUS FOR CONTINUOUSLY PRODUCING AT A SUBSTANTIALLY CONSTANT FLOW RATE A STRIP DOUGH OF SUBSTANTIALLY UNIFORM DIMENSIONS

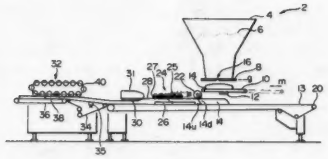
Michio Morikawa, and Torahiko Hayashi, both of Utsunomiya, Japan, assignors to Rheon Automatic Machinery Co., Ltd., Tokyo, Japan

Filed Mar. 30, 1988, Ser. No. 175,103

Claims priority, application Japan, Apr. 1, 1987, 62-80290

Int. Cl.[4] A21C *9/08*

U.S. Cl. 425—140 **8 Claims**



1. Apparatus for continuously producing, at a substantially constant flow rate, a strip of dough of substantially uniform dimensions, comprising:

(a) a hopper for dough,

(b) divider means provided downstream of said hopper for dividing said dough into portions,

(c) weighing and supplying means disposed adjacent said divider means for weighing each of said dough portions and supplying said dough portions,

(d) conveyor means for successively receiving said portions from said supplying means and conveying said dough portions, and provided with a path for said dough portions thereon,

(e) control means for providing a signal to the weighing means, when said conveyor means has conveyed a dough portion a distance proportional to the weight of said dough portion, to cause said weighing means to supply a subsequent dough portion to the area where dough portions are received on the conveyor means,

(f) pressing means disposed above said path downstream of said area and spaced apart from said path so as to cause said dough portions to have a determined thickness, and

(g) a pair of width defining members positioned, one on each side of said path, between said pressing means and said path, for constricting said dough portions so that they have a predetermined width.

4,883,418

PLASTICS INJECTION MOLDING MACHINE

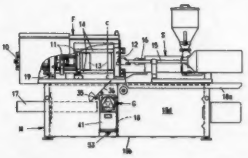
Karl Hehl, Arthur-Hehl-Str. 32, D-7298 Lossburg-1, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 116,218, Nov. 3, 1987, abandoned. This application Oct. 3, 1988, Ser. No. 252,124

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1986, 3637612

Int. Cl.[4] B29C *45/17*

U.S. Cl. 425—217 **20 Claims**



1. In an injection molding machine having a vertical longitudinal plane of symmetry and comprising:

a pedestal adapted to be supported on an approximately rectangular undersurface,

a horizontal injection molding unit, which is mounted on said pedestal and adapted to contain an injection mold, which is adapted to be opened and closed,

a horizontal clamping unit mounted on said pedestal and operable to clamp said mold in said injection molding unit,

an ejector for ejecting usable moldings and unusable parts from said mold in said injection molding unit when said mold is open, and

sorting means, which are mounted in said pedestal under said injection mold in said injection molding unit and comprise:

a housing,

pivotal mounting means mounted in said housing and defining a horizontal pivotal axis,

a sorting plate, which is mounted in said housing on said pivotal mounting means for a pivotal movement between first and second inclined positions, which respectively constitute a "pass" position and a "reject" position, which sorting plate is provided on mutually opposite sides with a first sliding surface, which is downwardly inclined and arranged to receive usable moldings from said ejector and to deliver said usable moldings on one side of said pivotal axis when said sorting plate is in said "pass" position, and a second sliding surface, which is arranged to receive unusable parts from said ejector and to deliver said unusable parts on the other side of said pivotal axis when said sorting plate is in said "reject" position, and

power-operated turning means for pivotally moving said

sorting plate from said "pass" position to said "reject" position and from said "reject" position to said "pass" position,

the improvement residing in that

said pedestal is generally parallelepipedic,

said sorting means constitute a sorting unit, which is detachably mounted in said pedestal with said pivotal axis extending at right angles to said plane of symmetry of the injection molding machine,

a belt conveyor unit is detachably mounted in said pedestal and arranged to receive usable moldings from said sorting plate when it is in said "pass" position, which belt conveyor has a conveying surface which adjoins said first sliding surface when said sorting plate is in said "pass" position,

said pedestal comprises a transverse wall, which defines in said pedestal an open-topped recycling space, and

said second sliding surface has a lower end, which is arranged to be disposed over said recycling space when said sorting plate is in said "reject" position.

4,883,419

DEVICE FOR THERMOFORMING PARTS FROM SYNTHETIC MATERIAL

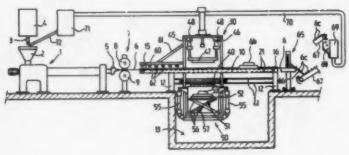
Joël Queirel, La vendue Mignot, Saint Julien, Les Villas (Aube), France 10800

Continuation of Ser. No. 139,175, Dec. 28, 1987, abandoned, which is a continuation of Ser. No. 906,083, Sep. 11, 1986, abandoned. This application Oct. 27, 1988, Ser. No. 263,984

Claims priority, application France, Sep. 11, 1985, 85 13483

Int. Cl.[4] B29C *1/14*

U.S. Cl. 425—326.1 **17 Claims**



1. An apparatus for manufacturing thermoformed parts comprising:

extrusion press means for continuously extruding thermoformable material;

an extrusion head on said press means through which said thermoformable material is extruded for producing a continuous flat strip of said material;

rolling means downstream of said extrusion head for receiving and rolling said flat strip of material;

substantially horizontal longitudinal members disposed downstream of said rolling means and extending substantially in a feed direction of said strip of material;

substantially horizontal feeding means mounted on said longitudinal members adapted to engage the longitudinal edges of said strip of material downstream of said rolling means for feeding said strip of material in said feed direction;

first drive means mounted on said longitudinal members and engaging said feeding means for imparting continuous movement to said feeding means and said strip of material;

a mobile thermoforming assembly downstream of said rolling means and through which said longitudinal members and said feeding means extend comprising,

thermoforming mold means movably mounted on one side of the plane of movement of said strip material when fed by said feeding means for movement into thermoforming engagement with said strip of material, backing means for said thermoforming mold means on the other side of said plane of movement of said strip of material,

heating means between said mold means and said rolling machine means for heating said strip of material prior to thermoforming by said mold means, said heating means having an entrance end spaced from said rolling means a predetermined distance to facilitate cooling of said strip of material to a predetermined hardness prior to entering said heating means, and

second drive means engaging said first drive means for moving said mobile assembly in said feed direction simultaneously with said feeding means and intermittently relatively to said feeding means in the direction opposite to said feed direction; and

mobile assembly supporting means for supporting and guiding said mobile assembly for said movement in and opposite to said feed direction.

4,883,420

DIE FOR EXTRUDING HONEYCOMB STRUCTURAL BODIES

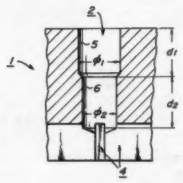
Sei Ozaki, Aichi; Satoru Inoue, Hazu, and Shoji Futamura, Kawasaki, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Continuation of Ser. No. 942,408, Dec. 16, 1986, abandoned. This application Sep. 2, 1988, Ser. No. 240,446

Claims priority, application Japan, Dec. 18, 1985, 60-284571

Int. Cl.[4] B29B *47/12*

U.S. Cl. 425—464 **14 Claims**



1. An extrusion die for forming ceramic honeycomb structural bodies from a mass of ceramic material, comprising:

an extrusion die body having an entrance surface and an exit surface, said surfaces being located on opposite parallel sides of said die body;

discharge channels formed in said exit surface, said channels being defined by a plurality of intersecting slits which form a matrix corresponding to the geometrical configuration of the honeycomb structural body to be formed thereby, such that said geometric configuration of said honeycomb structural body is formed solely by said discharge channels; and

a plurality of independent body supply holes formed in said entrance surface and extending into the die body from said entrance surface in a direction substantially normal to said entrance surface and directly communicating with said discharge channels, each of said body supply holes having at least two different, coaxially arranged, inner peripheral surface zones, said plurality of independent body supply holes being the first point at which said mass of ceramic material is separated while entering said extrusion die;

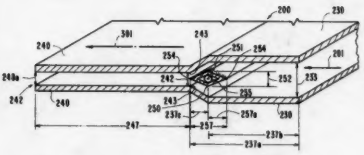
wherein the cross-sectional shapes of the body supply holes in each surface zone are substantially the same, and the cross-sectional dimensions of the body supply holes in axially adjacent surface zones are substantially different.

4,883,421

DIRECTIONAL FLOW BAR EXTRUDER

Ronnie G. Morgan, Northbrook, Ill., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Division of Ser. No. 24,079, Mar. 10, 1987, abandoned. This application Apr. 14, 1988, Ser. No. 181,709
Int. Cl.[4] B29C *47/00*; A22C *7/00*
U.S. Cl. 425—135 30 Claims



1. An extrusion nozzle for aligning fibers in an extrudable fiber-containing composition comprising:

a. a housing having an inlet channel and an outlet channel, said inlet and outlet channels being defined by substantially parallel top and bottom portions; a first intermediate portion connecting the top of the inlet channel to the top of the outlet channel at an upper leading and trailing apex; a second intermediate portion connecting the bottom of the inlet channel to the bottom of the outlet channel at a lower leading and trailing apex; the first and second intermediate portions converging toward the outlet channel such that the height of the outlet channel is less than the height of the inlet channel;

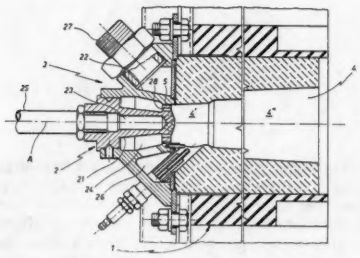
b. at least one fiber-aligning flow bar having an essentially diamond-shaped cross-section having an upper and lower leading face converging to an acute angle leading edge and an upper and lower trailing face converging to an acute trailing edge, the leading and trailing edges defining a length of the flow bar and wherein said flow bar is operatively disposed transversely between and spaced from the converging first and second intermediate portions and the inlet channel of said housing to effect fiber alignment of a substantial amount of fiber in the extrudable composition.

4,883,422

MIXED AIR AND GAS NOZZLE FOR GAS BURNERS, IN PARTICULAR BURNERS OF LOW THERMAL OUTPUT FOR FIRING KILNS

Eugen D. Cristea, Zibido S. Giacomo, Italy, assignor to T.T.C. Termo Tecnica Ceramica S.P.A., Modena, Italy

Filed Apr. 5, 1989, Ser. No. 333,614
Claims priority, application Italy, Apr. 5, 1988, 46826 A/88
Int. Cl.[4] F23M *9/00*
U.S. Cl. 431—182 5 Claims



1. A mixed air and gas nozzle for gas burners, particularly burners of low thermal output for firing kilns, the nozzle being applied to an axially elongated combustion chamber and of the type comprising:

a first part (21) and a second part (22), of which the first is inserted into and coupled to the interior of the second and is coaxial thereto;

a first elongated axial chamber (23) provided in the first part (21) coaxial to the combustion chamber and communicating with gas feed means;

a second chamber (24) coaxially surrounding the first chamber (23) and provided between said first and second part (21) and (22) and communicating with air feed means; said first and second chamber (23) and (24) being separated from the combustion chamber (4) by a circular front plate (5) which closes the initial circular section of the combustion chamber; characterised in that said front plate comprises:

a first series of apertures (31) providing communication between the second chamber (24) and the combustion chamber and disposed on the periphery of the front plate (5) such that their axes lie substantially on one and the same cylindrical surface coaxial to the combustion chamber (4) and are inclined tangentially in the same direction by an angle of about 30–60 degrees to the generators; of the cylindrical surface

a second series of apertures (32) providing communication between the second chamber (24) and the combustion chamber and disposed on one and the same circumference concentric to but inward of the periphery of the front plate (5);

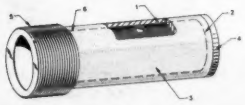
a third series of apertures (33) providing communication between the first chamber (23) and the combustion chamber and disposed a shorter distance from the center of the plate (5) than the second apertures (32); the proportion of air throughput passing through the second apertures to the total air throughput passing through the apertures (31) and (32) being between 15% and 30%.

4,883,423

METHOD FOR MAKING AN INFRARED BURNER

Alex Holowczenko, Kirkville, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed May 8, 1989, Ser. No. 348,369
Int. Cl.[4] F23D *14/12*
U.S. Cl. 431—328 8 Claims



1. A method of making an infrared burner comprising:

(a) admixing alumina, ceramic fibers, a binder, a carrier, and a clathrate-forming halocarbon, while keeping the mixture uniformly suspended;

(b) cooling the mixture to a temperature below the clathrate-forming temperature;

(c) depositing the mixture onto a mesh screen substrate; and

(d) drying the screen at a temperature sufficient to melt the clathrate and evaporate the carrier forming small void areas in the deposited mixture;

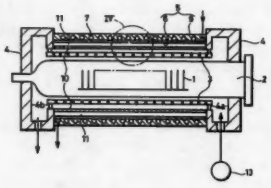
thereby producing a porous coating on the screen having structural integrity, the ability to generate radiant energy at a rate of 80,000 BTU to 100,000 BTU per sq. ft. per hour, a pressure drop during operation of less than 0.4 inch of water, and a pressure drop cold versus hot of less than 0.20 inch of water.

4,883,424

APPARATUS FOR HEAT TREATING SUBSTRATES

Takamasa Sakai, and Yuusuke Muraoka, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Aug. 17, 1988, Ser. No. 233,236
Claims priority, application Japan, Aug. 21, 1987, 62-208943
Int. Cl.[4] F27D *15/02*
U.S. Cl. 432—77 8 Claims



1. An apparatus for heat treating a substrate, said apparatus comprising:

a container for housing a substrate to be heated;

heating means for enclosing said container and for heating said substrate;

heat intercepting means for intercepting heat generated by said heating means, said heat intercepting means enclosing said heating means;

an outer furnace enclosing said heat intercepting means, said outer furnace having an inner surface;

a reflector formed on said inner surface of said outer furnace for reflecting heat generated by said heating means; and

a sealed layer of heat insulating gas located between said heat intercepting means and said outer furnace; and

wherein said outer furnace has cooling means associated therewith for cooling said reflector.

4,883,425

DENTAL PROBE ASSEMBLY

Alan W. Zimble, 507 Blackgates Rd., Wilmington, Del. 19803

Filed Aug. 26, 1988, Ser. No. 236,773
Int. Cl.[4] A61C *3/00*
U.S. Cl. 433—32 17 Claims

1. 1 A probe assembly for depth measurement comprising a hand held portable tool having a handle section at one end thereof, a probe mounted to the end of said tool remote from said handle, said probe being made of a light conducting material, means for transmitting light to said probe, and means for indicating the depth of a gum pocket or the like in accordance with the length of said probe remaining out of the pocket when said probe is inserted into the pocket.

4,883,426

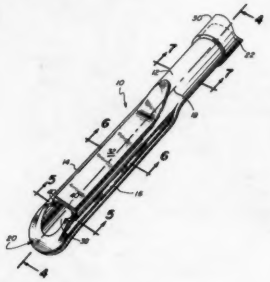
DENTAL IMPLEMENT FOR FLUID ASPIRATION AND TISSUE RETRACTION

Euler R. Ferrer, 410 N. Bristol "C", Santa Ana, Calif. 92703

Continuation-in-part of Ser. No. 128,219, Dec. 3, 1987. This application Jul. 5, 1988, Ser. No. 215,407
Int. Cl.[4] A61L *17/04*
U.S. Cl. 433—91 23 Claims

1. A dental implement for the aspiration of fluids from a patient's mouth and for the retracting of soft tissues in said patient's mouth, the dental implement comprising a slender, elongate and substantially straight member having:

(a) a hollow tubular portion having a longitudinal axis and having a suction end and a connection end remote from the suction end for enabling the member to be connected to a suction tube or the like; and,



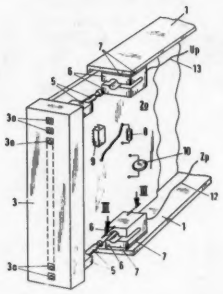
(b) first and second, longitudinally extending fins which project sidewardly from opposite, lower, side regions of said tubular portion, said fins being of substantially uniform width and being rigid and relatively narrow and extending along a substantial length of said tubular member from the suction end thereof and extending around the suction end of the tubular portion so as to join one another at a vertical plane through said longitudinal axis.

4,883,427

APPARATUS FOR SUPPLYING VOLTAGE TO COMPONENT ASSEMBLIES

Gerhard Kohl, Frankenthal, Fed. Rep. of Germany, and Mogens B. Christiansen, Lengnau, Switzerland, assignors to Asea Brown Boveri AG, Baden, Switzerland

Filed Apr. 1, 1988, Ser. No. 176,775
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1986, 3633695
Int. Cl.[4] H01R *23/68;* H05K *7/10*
U.S. Cl. 439—64 4 Claims



1. Voltage supply apparatus, comprising a component assembly rack having a top and a bottom; a plurality of component assemblies to be plugged into said component assembly rack, each of said component assemblies having a front part subject to interference potential, a rear part free of interference potential, and a contact strip mechanically rigidly connected to said front part of said component assembly for feeding process signals to said component assembly, said contact strip having upper and lower parts; separate voltage supplies for said front

and rear parts of said component assembly; a front plug to be connected to said contact strip for supplying external process signals; a pair of plugs each being disposed at a respective one of said upper and lower parts of said contact strip in the vicinity of said front part of said component assembly, components disposed on said front part of said component assembly and electrically connected to said plugs, and electrically insulated sockets each being disposed at a respective one of said top and said bottom of said component assembly rack, said plugs and said sockets being in electrical contact when said component assembly is plugged into said component assembly rack.

4,883,428

TEST SOCKET INCORPORATING CIRCUIT ELEMENTS

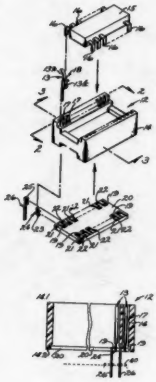
Takashi Tonooka, Shizuoka, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 23, 1988, Ser. No. 159,152

Claims priority, application Japan, Feb. 27, 1987, 62-046301

Int. Cl.[4] H01R *23/72*

U.S. Cl. 439—69 **6 Claims**



1. A socket comprising an electrically insulating body having a top, having a bottom of selected area, and having a plurality of openings extending through the body between said top and bottom; an insulating base board having a selected area corresponding to the area of the bottom of the body accommodated at the bottom of the body; a plurality of circuit components mounted in spaced relation to each other on the base board; first circuit means on the base board secured to respective first portions of the components on the base board for making electrical connections to the respective components; other circuit means on the base board secured to respective other portions of the components on the base board for electrically connecting the components in a circuit; a plurality of electrically conductive contacts disposed in the respective body openings for detachably electrically engaging respective terminal pins of an integrated circuit unit inserted therein from the top of the body to mount the integrated circuit unit on the socket, said contacts having portions connected to respective first circuit means on the base board for electrically connecting the terminal pins of the integrated circuit to the respective components and for mounting and supporting the insulating base board on the body at the bottom of the body; and a plurality of terminal members secured to said respective other circuit means on the base board to be electrically connected to the respective circuit components and to support the terminal members to extend from the base board to be connected in an external circuit for connecting the integrated circuit terminal pins in the external electrical circuit with the circuit components in series between the respective integrated circuit unit terminal pins and said external circuit.

4,883,429

ELECTRONIC DEVICE PACKAGING STRUCTURE

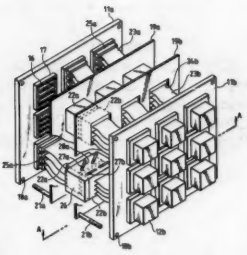
Takao Suzuki, Ohme, and Kouzou Uekido, Tokyo, both of Japan, assignors to Japan Aviation Electronics Industry, Limited and NEC Corporation, both of Tokyo, Japan

Filed Jan. 25, 1989, Ser. No. 302,167

Claims priority, application Japan, Feb. 3, 1988, 63-13389[U]

Int. Cl.[4] H01R *9/90*

U.S. Cl. 439—74 **4 Claims**



1. An electronic device packaging structure comprising:

first and second back panels, each having mounted on its one side a plurality of arrays of electronic circuit packages with their signal input/output terminals projecting out onto the other side;

pluralities of first and second wiring cables connected at one end to connectors connected to the signal input/output terminals of the first and second back panels;

first and second relay connector means connected to the other ends of the first and second wiring cables and detachable from each other; and

first and second frames for fixing thereto the first and second relay connector means, the first and second frames being detachably coupled together via the first and second relay connector means.

4,883,430

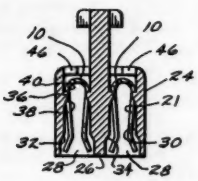
BRIDGE CLIP CARRIER

John A. Siemon, Watertown, and Brian E. Reed, New Hartford, both of Conn., assignors to The Siemon Company, Watertown, Conn.

Filed Jun. 6, 1988, Ser. No. 202,956

Int. Cl.[4] H01R *31/08*

U.S. Cl. 439—510 **15 Claims**



1. A bridge clip carrier device comprising:

a substantially rectangular insulative housing having a top face and an opposed bottom face;

at least a pair of spaced, parallel substantially rectangular cavities in said housing with each cavity terminating on said bottom face at an opening;

bridge clip retaining means in each of said cavities;

a discrete electrical bridge clip disposed in at least one of

said cavities, said bridge clip being retained therein by said bridge clip retaining means;

a pair of registered apertures through said top face of said housing to permit communication between test probe means and each bridge clip disposed in each of said cavities; and

handle means extending upwardly from said top face of said housing with said apertures being on opposed sides of said handle means.

4,883,431

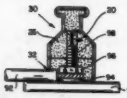
GEL-FILLED CAP MEMBER

David Uken, Fremont, Calif.; R. Grant Truesdale, Jr., Cary, and Daniel L. Swan, Raleigh, both of N.C., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Sep. 26, 1986, Ser. No. 912,309

Int. Cl.[4] H01R *13/52*

U.S. Cl. 439—521 **8 Claims**



1. A cap member for a threaded contact member, the cap member comprising:

(A) a hollow body having a closed end, an open end and a wall;

(B) a retaining nut member positioned within said body for engaging the threads of the contact member;

(C) a gel substantially filling said body, said gel having a cone penetration value from approximately 100 to 350 (10^{-1}mm) and an ultimate elongation of at least approximately 200%;

said body at the open end having a notch for receiving a wire connected to the threaded contact member; the notch having a first axially disposed portion which is positioned generally parallel to the longitudinal axis of the cap member and a second circumferentially disposed portion which is (a) positioned generally perpendicular to the longitudinal axis of the cap member and (b) as adapted to lift and hold the wire away from the open end when the cap member is rotated about the longitudinal axis.

4,883,432

MODULAR JACK YOKE

Brian E. Reed, New Hartford, Conn., assignor to The Siemon Company, Watertown, Conn.

Filed Dec. 28, 1988, Ser. No. 291,107

Int. Cl.[4] H01R *13/74*

U.S. Cl. 439—553 **10 Claims**

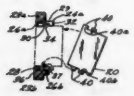
1. A modular telecommunications jack yoke, comprising:

a unitary body, said body including a front face;

at least one rectangular opening in said body for receiving at least one modular telecommunications jack, said opening having opposed first and second sides;

a first stop extending from the first side into the opening;

a resilient, cantilevered hook extending from the first side and spaced back from the first stop, said first stop and hook cooperating with said modular telecommunications



jack to affect locking of said modular telecommunications jack within said opening; and

mounting means for mounting said body to a support.

4,883,433

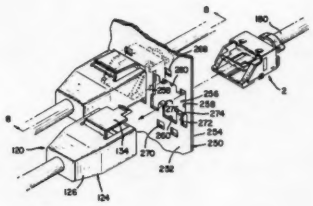
ELECTRICAL CONNECTOR FOR DATA DISTRIBUTION PANEL

David Lane, Greensboro, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 21, 1987, Ser. No. 136,090

Int. Cl.[4] H01R *13/00*

U.S. Cl. 439—607 **8 Claims**



1. An electrical data connector for interconnection to an electrically shielded cable, and for the matable interconnection to a data distribution panel, the connector comprising:

(a) a shielded subassembly comprising:

(i) an insulative housing means having terminal supporting means including a platform for the receipt of a plurality of electrical terminals, and sidewalls upstanding from the platform, the platform and the sidewalls defining an open upper face of the housing means,

(ii) a plurality of electrical terminals including base portions for mounting on the platform in transition with reversely bent portions forming resilient contact portions, the contact portions extending rearwardly to free ends of the terminals, the contact portions being intermatable with like contact portions in a complementary connector, the terminals further comprising wire connecting portions extending from end of the terminal base portions,

(iii) an insulative cap member, securable within the housing means, including means of aligning individual wires of the shielded cable with selected wire connecting portions,

(iv) shield means securable to the housing means, and substantially enclosing the exterior of the sidewalls, the exterior of the platform, and the open upper face of the platform, thereby overlying the terminal wire connecting portions, the insulative cap member providing a spaced relation between the shield means and the wire connecting portions of the terminals, the shield means

comprising upper and lower shield members each having at least one outward projection therefrom; and

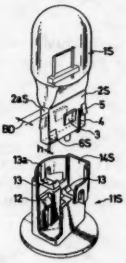
(b) an insulative cover means which is slidably received over the shielded subassembly, and includes latch means which are snap latchable to the panel, the housing means includes a one-piece molded member having a central body portion having an internal cavity for receiving the shielded subassembly, the projections on the shield means providing an interference fit between the cover means and the shield means, retaining the cover means and shield means together.

4,883,434

WEDGE-BASE LAMP AND SOCKET ASSEMBLY

Akira Toyoshima, Shiki, Japan, assignor to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Nov. 17, 1988, Ser. No. 273,191
Claims priority, application Japan, Oct. 7, 1988, 63-253431
Int. Cl.[4] H01R *17/00*
U.S. Cl. 439—619 3 Claims



1. A wedge-base lamp and socket assembly in which a double filament socket excludes the entry of a single filament lamp, comprising:

a wedge-base lamp having an envelope containing at least one filament therein, a wedge base coupled to said envelope, and a pair of projections formed on opposite sides of said wedge base near the center of said wedge base;

a socket for receiving a wedge base of a wedge-base lamp therein, said socket having a pair of arms which are engageable with said pair of projections of said wedge-base lamp when said wedge base of said wedge-base lamp is mounted within said socket;

and wherein said wedge-base lamp is of the single filament wedge-base type and has a fool-proof projection on said base thereof; and

wherein said socket is a double filament type wedge-base socket and has an abutment portion therein which is abuttingly engageable with said fool-proof projection of said single filament type wedge-base lamp when said single filament type wedge-base lamp is inserted into said double filament type wedge-base socket, to prevent full entry of said single filament type wedge-base lamp into said double filament type wedge-base socket, thereby preventing erroneous coupling between a single filament type wedge-base lamp and a double filament type wedge-base socket;

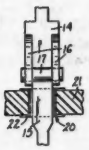
and wherein said abutment portion of said double filament type wedge-base socket is arranged such that when a double filament type wedge-base lamp is used in place of said single filament type wedge-base lamp, said double filament type wedge-base lamp being free of said fool-proof projection so that full entry of said double filament type wedge-base lamp into said double filament type wedge-base socket is permitted without said abutting engagement.

4,883,435

SOLDER-BEARING TERMINAL PIN AND LEAD

Jack Seidler, Flushing, N.Y., assignor to North American Specialties Corporation, Flushing, N.Y.

Continuation of Ser. No. 876,820, Jun. 20, 1986, abandoned, which is a continuation-in-part of Ser. No. 600,362, Apr. 16, 1984, abandoned, which is a continuation of Ser. No. 396,764, Jul. 9, 1982, abandoned, and a continuation-in-part of Ser. No. 850,754, Apr. 11, 1986, Pat. No. 4,728,305, which is a continuation-in-part of Ser. No. 793,654, Oct. 31, 1985, Pat. No. 4,679,889, which is a continuation-in-part of Ser. No. 737,230, May 24, 1985, Pat. No. 4,605,278. This application Dec. 7, 1987, Ser. No. 129,715
Int. Cl.[4] H01R *4/02*
U.S. Cl. 439—876 13 Claims



1. A solder-bearing lead adapted to be soldered to a conductive area on a substrate having a lead-receiving opening, said lead comprising

an elongated body having an upper body portion and a lower body portion, said lower body portion being sized to fit in said substrate opening substantially perpendicular to said substrate,

said body being cut longitudinally to define a finger having a first end integral with and attached to said body and also having a free end,

said finger being bent out of the plane of said body and having a portion spaced from and in opposition to said body,

a solder mass,

said finger being bent only partially around said solder mass with each solder mass held between said finger free end and said body, said finger free end being wrapped only partially around said solder mass to leave at least a portion of said solder mass uncovered by said finger,

said uncovered solder mass portion being in a position to confront directly and to contact said substrate conductive area with the end of said finger adjacent to said conductive area but not interposed between said solder mass and said conductive area,

said body also being cut longitudinally along a second line to define a second finger, said fingers being separated by said upper body portion, both of said fingers being wrapped only partially around said solder mass.

4,883,436

KNEEBOARD WITH RETRACTABLE FINS

Dennis N. Oakland, Woodinville, Wash., assignor to O'Brien International, Inc., Redmond, Wash.

Continuation of Ser. No. 99,127, Sep. 21, 1987, abandoned. This application Apr. 19, 1989, Ser. No. 341,292
Int. Cl.[4] B63B *41/00*
U.S. Cl. 441—65 11 Claims

1. A kneeboard comprising an elongated body having top

and bottom surfaces and front and rear end portions, a fin movably mounted in the rear end portion of the body, the fin being movable between a lowered position in which it extends downwardly below the bottom surface of the kneeboard and a raised position, and operating means mounted on the front end portion of the body for moving the fin from its lowered position to its raised position, the operating means comprising a channel-shaped bracket mounted in the body, a slide slidably positioned within the channel, a knob positioned above the channel, and locking means on the knob for engaging the slide and retaining the slide in a desired position within the channel, the cable being secured to the slide, whereby movement of the slide within the channel retracts the fin from its lowered position toward its raised position.

4,883,437

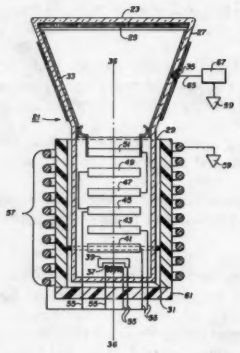
METHOD FOR SPOT-KNOCKING AN ELECTRON GUN MOUNT ASSEMBLY OF A CRT UTILIZING A MAGNETIC FIELD

Karl G. Hernqvist, Princeton, N.J., assignor to RCA Licensing Corp., Princeton, N.J.

Continuation-in-part of Ser. No. 214,556, Jun. 29, 1988, abandoned. This application Mar. 29, 1989, Ser. No. 330,015

Int. Cl.[4] H01J 9/44

U.S. Cl. 445—5 **7 Claims**



1. In a method for spot-knocking a completed CRT having an electron gun with a plurality of spaced apart gun elements including a heater, a cathode, a control electrode, a screen electrode, at least one focus electrode and at least one anode arranged along a longitudinally extending gun axis, the steps comprising

interconnecting selected ones of the gun elements including at least said heater, said cathode, said control electrode and said screen electrode,

providing a magnetic field along said gun axis, and

applying spot-knocking voltages between said anode and the interconnected gun elements.

4,883,438

METHOD FOR SPOT-KNOCKING AN ELECTRON GUN MOUNT ASSEMBLY OF A CRT

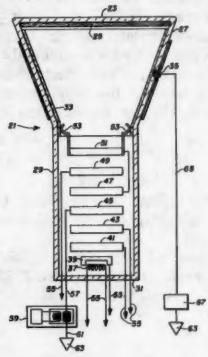
Karl G. Hernqvist, Princeton, N.J., assignor to RCA Licensing Corp., Princeton, N.J.

Continuation-in-part of Ser. No. 214,554, Jun. 29, 1988, abandoned. This application Mar. 29, 1989, Ser. No. 336,609

Int. Cl.[4] H01J 9/44

U.S. Cl. 445—5 **9 Claims**

1. A method for spot-knocking an electron gun mount assembly in an evacuated CRT, said mount assembly comprising a plurality of gun elements including a heater, a cathode, a control electrode, a screen electrode, a first focus electrode, a first anode, a second focus electrode and a second anode, said method comprising the step of applying spot-knocking voltages between said first and second anodes, and said first focus electrode, the remaining gun elements being electrically floating.



4,883,439

APPARATUS FOR FIXTURING A CATHODE RAY TUBE

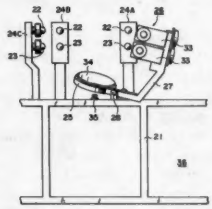
Tatsurou Sakamoto; Masayoshi Ito, both of Gifu, and Yoshinori Yamano, Aichi, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 7, 1987, Ser. No. 129,142

Claims priority, application Japan, Dec. 8, 1986, 61-291911

Int. Cl.[4] H01J 9/24

U.S. Cl. 445—66 **8 Claims**



5. A cathode ray tube fixturing device for aligning a face panel and a funnel for a frit sealing process comprising:

a cone holder proportioned to engage a constricted portion of said funnel,

a movable abutting block arranged to abut said panel and said funnel,

a pivotal arm arranged to position said movable abutting block into abutting relation with said panel and said funnel, said cone holder mounted on said pivotal arm, whereby said pivotal arm pivots in response to said funnel being placed in said cone holder, and

at least one fixed abutting block arranged to abut said panel and said funnel in opposed relation to said movable abutting block,

said panel and said funnel when located in said cone holder being oriented along a vertical axis, and said movable abutting block being positioned upon movement to urge said panel and said funnel against said fixed abutting block,

said cone holder having a circular annular shape and including an inside contact member arranged to contact said

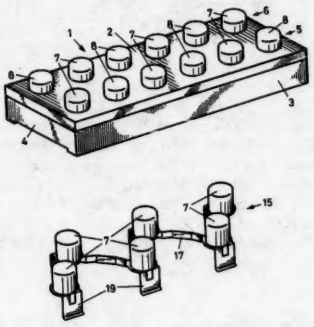
funnel in a continuous line contract, said inside contact member being composed of a carbonaceous material.

4,883,440

ELECTRIFIED TOY BUILDING BLOCK WITH ZIG-ZAG CURRENT CARRYING STRUCTURE

Peter Bolli, Steinhausen, Switzerland, assignor to Interlego A.G., Baar, Switzerland

Filed Jan. 29, 1987, Ser. No. 8,640
Claims priority, application Switzerland, Feb. 5, 1986, 461/86
Int. Cl.[4] A63H *33/08*
U.S. Cl. 446—91 **11 Claims**



1. A building block for a toy construction set comprising:

a top wall having an outer surface and an inner surface;

a side wall extending from said top wall;

a plurality of coupling pins on the outer surface of said top wall; said coupling pins each having electrically conductive means and said pins being arranged in at least two equally spaced rows forming at least two equally spaced columns of pins, the rows and columns being orthogonally directed:

means for electrically connecting alternate coupling pin conductive means of one row with alternate coupling pin conductive means of an adjacent row whereby no coupling pin is electrically connected to the coupling pin in neither the immediately adjacent row, nor the immediately adjacent column, thereby forming two separate electrical conductors; and,

counter coupling means for engaging pins of another block, said counter coupling means being on said top wall inner surface and including said side wall.

4,883,441

DOLL

Andrew Byer, 11839 Doral Ave., Northridge, Calif. 91326

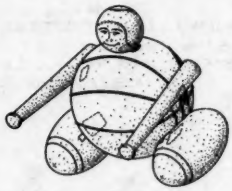
Filed Oct. 12, 1988, Ser. No. 256,845
Int. Cl.[4] A63H *3/16, 3/02*
U.S. Cl. 446—99 **2 Claims**

1. A doll comprising:

a spherical head having soft cloth head covering containing a soft filling, said covering including at least an embroidered mouth and eyes and an embroidered baseball-like seam, said covering also having a fastener strip thereon spaced apart from said mouth and opposite said eyes;

a pair of elongate arms, each arm having a soft arm cloth covering containing a soft filling, each arm tapering from a larger end to a smaller end, said smaller end terminating in a knob, each arm having a fastener strip disposed on said covering adjacent said larger end thereof;

a pair of oblong legs, each leg having a soft cloth covering containing a soft filling, said leg covering having a pair of spaced apart annular and embroidered bands and embroidered football-like seams positioned in between said bands, said leg covering further including a fastener strip overlying said football-like seam;



a spherical body having a soft cloth body covering containing a soft filling, said body having a plurality of embroidered basketball-like meridians on said covering thereof, and a plurality of body fastener strips releasably engageable to said fastener strips on said head, arms, and legs, said body fastener strips generally positioned on said body and equally spaced apart over a single meridian circumscribing said body.

4,883,442

PREGNANT MOTHER DOLL AND SEPARABLE BABY DOLL

Ida B. Kaplan, Cincinnati, Ohio, assignor to MTR Enterprises, Cincinnati, Ohio

Filed Jan. 20, 1987, Ser. No. 5,208
Int. Cl.[4] A63H *3/02*
U.S. Cl. 446—320 **4 Claims**

1. A doll set comprising a pregnant mother doll and separate baby doll,

said mother doll having a head, trunk, arms and legs, the trunk having the profile of a woman who is not pregnant, and means presenting an elastically expansible and contractable external pouch on the abdomen area of the trunk, said means being of stretchable fabric material,

said pouch being presented in an undergarment which is fitted snugly over the trunk of the mother doll,

said pouch opening downwardly just above the legs of the mother doll and dimensioned to receive and hold said baby doll within it to simulate the shape of a pregnant

woman, said pouch being contracted elastically so as to conform to an assume the shape of said trunk so that the mother doll appears trim and not pregnant when the baby doll is not within said pouch,

said baby doll being dimensioned and shaped to fit within the pouch and, when in the pouch, to impart a rounded appearance to the pouch so as to simulate pregnancy of the mother doll.

4,883,443

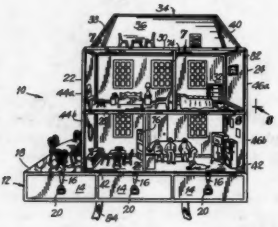
FOLDING PLAY STRUCTURE

Herbert S. Chase, One Lincoln Plaza, New York, N.Y. 10398

Filed Sep. 12, 1988, Ser. No. 242,561

Int. Cl.[4] A63H *3/52, 33/00*

U.S. Cl. 446—478 **13 Claims**



1. A collapsible play structure, comprising an enclosed box-like base unit having storage means located therein; a pair of opposed parallel and upright side wall panels, each of which having pairs of opposed upper and lower and front and back edges, each of said wall panels being pivotly mounted to said base along said lower edge; a plurality of horizontal panels, each of which having pairs of opposed first and second sides and front and back edges, each of said horizontal panels being pivotly mounted to and between said side walls along said sides of said horizontal panels; a front wall panel extending upwardly between said side walls between the front edges thereof and extending horizontally between said side walls, said front wall panel being pivotly attached to the front edge of one of said horizontal panels by a hinge means; and lock means mounted to said horizontal panels and said front wall panel to retain said horizontal and front wall panels in an abutting relationship whereby the structure is retained in the upright and upstanding position.

4,883,444

COUPLING FOR TRANSMITTING A ROTARY MOTION

Ernst Strickler, Wolfhausen, and Hansueli Wild, Jona, both of Switzerland, assignors to Mettler Instrumente AG, Greifensee, Switzerland

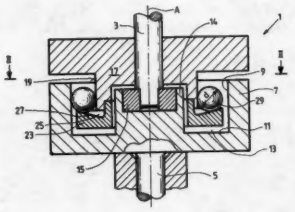
Filed May 9, 1988, Ser. No. 191,587

Claims priority, application Switzerland, Jun. 2, 1987, 2092/87

Int. Cl.[4] F16D *41/06*

U.S. Cl. 464—160 **6 Claims**

1. A coupling for transmitting a rotary motion in both directions of rotation, the coupling including a vertically extending drive shaft and a vertically extending driven shaft having an axis of rotation, the driven shaft having an end, a clamping disk mounted on the drive shaft, the clamping disk defining a peripheral surface, the peripheral surface having at least one partial constriction, an annular plate mounted between the drive shaft and the driven shaft, the annular plate defining a circumferential surface opposite the clamping disk, the circumferential surface being located essentially concentrically with the axis of rotation and being inclined relative to the horizontal, at least one ball having a diameter being placed on the circumferential surface, and a cage attached to the end of the driven shaft, the cage defining a guide surface facing the peripheral surface of the clamping disk and the circumferential surface, a spacing defined between the peripheral surface and the guide surface, the spacing being greater than the diameter of the at least one ball at the constriction and being smaller than the diameter of the at least one ball at at least a portion of the peripheral surface, such that the coupling has a freewheeling capability in both directions for rotary motion introduced into the driven shaft when the at least one ball is located at the constriction and that when the drive shaft is rotated the at least one ball is moved radially outwardly and in clamped engagement between the peripheral surface of the clamping disk and the guide surface of the cage resulting in a transmission of rotary motion from the drive shaft to the driven shaft.



4,883,445

DEVICE FOR TENSIONING OF A PULLING ELEMENT OF A PRINTER

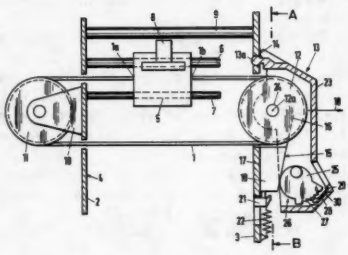
Günter Gomoll, Nersingen/Leibi, and Wolfgang Hauslaib, Langenau, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Sep. 26, 1988, Ser. No. 248,659

Claims priority, application European Pat. Off., Oct. 16, 1987, 87 730 130.9

Int. Cl.[4] B41J *19/20;* F16H *7/14*

U.S. Cl. 474—113 **17 Claims**



1. A tensioning device for tensioning of a pulling element in a printer comprising

a frame;

an axis fixed relative to the frame;

a carriage movable back and forth and having a first and a second end;

a flexible line attached to the first end of the carriage;

a first deflection roller guiding the flexible line coming from the carriage, where the first deflection roller is rotatably supported relative to the axis fixed relative to the frame;

a second deflection roller having a second axis and guiding the flexible line coming from the first deflection roller and where the second end of the flexible line coming from the

second deflection roller is attached at the second end of the movable carriage;

an axle disposed in parallel to the second axis of the second deflection roller;

a frame surface disposed perpendicular to the direction of the flexible line disposed between the first deflection roller and the second deflection roller;

a wedge face having a slope relative to the frame surface and which wedge face can be shifted parallel to said frame surface disposed perpendicular to the direction of the flexible line;

a tension spring attached to the frame and to the wedge, which tension spring acts in the sense of an increase in tensioning force of the flexible line;

a tiltable lever formed as a covering casing and rotatably supporting the second deflection roller, which tiltable lever is supported at the axle disposed in parallel to the second axis of the second deflection roller and where the tiltable lever rests against said wedge face and which wedge face is subjected to the force of the tension spring, which tension spring acts in the sense of an increase in tensioning force;

support bearings supporting the second deflection roller and mounted to the tiltable lever;

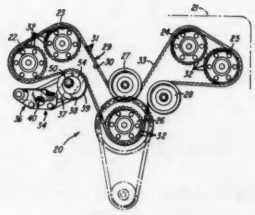
an adjustable cam settable to a fixed cam position and rotatably disposed in the tiltable lever formed as a covering casing and said cam having a surface contacting the wedge surface.

4,883,446

BELT TENSIONING SYSTEM, TENSIONER AND PARTS THEREFOR AND METHODS OF MAKING THE SAME

James L. Mitchell, Springfield, Mo., and Daniel P. Bexten, Columbus, Miss., assignors to Dayco Products, Inc., Dayton, Ohio

Filed Mar. 14, 1989, Ser. No. 323,539
Int. Cl.[4] F16H 7/12
U.S. Cl. 474—133 **28 Claims**



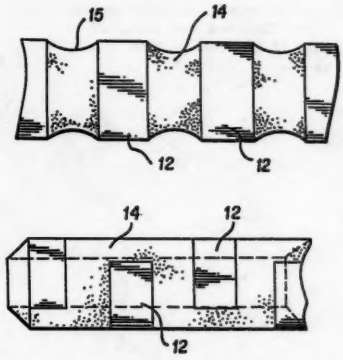
1. In a belt tensioning system comprising a support means, an endless transmission belt construction carried by said support means and arranged to move in a certain path, an arm pivotally mounted to said support means, a pulley rotatably carried by said arm and being in engagement with said belt construction, and an actuator carried by said support means and having opposed ends, said actuator having a movable piston projecting out of one of said opposed ends thereof and being in engagement with said arm to pivot said arm in a direction to urge said pulley into said belt construction as said piston is extended outwardly from said one of said opposed ends of said actuator, the improvement wherein the other of said opposed ends of said actuator is pivotally mounted to said support means whereby said actuator pivots relative to said support means as said piston thereof extends and retracts at said one end thereof.

4,883,447

POWER TRANSMISSION BELT

Saul Schulhoff, Jr., 3502 Fallstaff Rd., Baltimore, Md. 21215

Filed Dec. 21, 1987, Ser. No. 136,202
Int. Cl.[4] F16G 5/00, 5/10, 5/12
U.S. Cl. 474—242 **17 Claims**



8. A belt for transmitting power, comprising:

a band formed of a resilient binder;

a plurality of traction members spaced apart from one another, said traction members being formed integrally within said resilient binder;

said traction members being formed at least in part from a dense, abrasion-resistant material;

said traction members having a density greater than that of said resilient binder; and

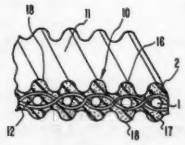
said traction members extending substantially transversely across and laterally outward from said resilient binder.

4,883,448

BELT HAVING EMBEDDED WIRES INTERLACED ACROSS LENGTHWISE SURFACES OF SHAFTS

Toshimitsu Kobayashi, Tokai; Akio Inagaki, Okazaki; Yasuhiro Kobayashi; Masanori Mori, both of Chiryu, and Takashi Sakakibara, Handa, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichin, Japan

Filed Jul. 8, 1988, Ser. No. 216,520
Claims priority, application Japan, Jul. 10, 1987, 62-173407; Jul. 10, 1987, 62-173408
Int. Cl.[4] F16G 1/10
U.S. Cl. 474—260 **13 Claims**



1. A belt comprising:

a main body including a first plurality of cogs defining an upper surface and a second plurality of cogs defining lower surface with said body formed into an endless configuration;

a plurality of substantially equally pitched approximately round shafts with each shaft disposed between an upper surface cog and a corresponding lower surface cog; and

a plurality of wires interlaced with said shafts in such a manner that each shaft is positioned at a portion at which two adjacent wires intersect.

4,883,449

DEVICE FOR MAKING GROOVES IN CIGARETTE FILTERS

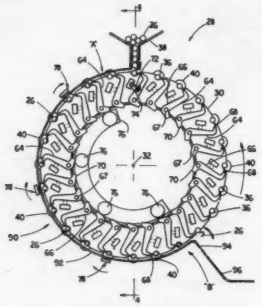
Richard Heaney, Campbell, and Erik I. Naslund, Los Gatos, both of Calif., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Jul. 18, 1984, Ser. No. 632,081

The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.

Int. Cl.[4] B29C *43/08;* A24C *3/02, 3/04*

U.S. Cl. 493—43 **20 Claims**



1. An apparatus for making elongated grooves in the peripheral surface of a filter rod, comprising:

a generally cylindrical, rotatable drum;

means for rotating the drum operatively associated therewith;

means defining a plurality of filter rod receiving channels in the peripheral surface of the drum, the filter rod receiving channels being open to the peripheral surface of the drum, the longitudinal axes of the channels being generally parallel to the rotational axis of the drum; means operatively positioned relative to said channels for depositing filter rods to be grooved in the channels; means for successively forming grooves in the peripheral surface of the filter rods while the filter rods remain disposed in the channels, the groove forming means being located adjacent each of the filter rod receiving channels and selectively movable into and out of the channels, the grooves being circumferentially spaced apart around the periphery of the filter rod; and,

means associated with said drum for indexing filter rods relative to the rotation of the drum in selected ones of the channels while the filter rods remain in the filter rod receiving channels about the longitudinal axes of the filter rods to position the filter rods for succeeding groove formation by the groove forming means as the drum continues to rotate.

4,883,450

PROCESS FOR MAKING SINGLE SIDE FREE PLASTIC BAG

Gordon L. Benoit, Macedon, N.Y., assignor to Mobil Oil Corp., New York, N.Y.

Filed Nov. 2, 1987, Ser. No. 115,318

Int. Cl.[4] B31B *1/64*

U.S. Cl. 493—196 **9 Claims**

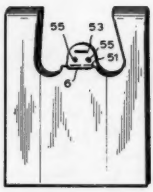
1. A method of continually making thermoplastic film bags having one side substantially free for separation from an opposite side; comprising:

providing a continuous tube of thermoplastic film for formation of said bags, said tube having a continuous wall which forms opposing front and rear sides;

separating said front and rear sides of said continuous wall from each other;

intermittently at least partially cutting one of said opposing sides of said continuous wall of said continuous tube at intervals corresponding to single bag lengths, thereby providing cuts therein at said intervals;

forming sealed seams across said continuous tube at intervals which provide sealed bottom ends for said bags; and



severing said continuous tube at intervals to separate individual bags from said continuous tube such that each of said separated individual bags includes front and rear sides formed from said front and rear sides of said continuous wall of said continuous tube, top and bottom ends, and a cut within one of said front and rear sides thereof.

4,883,451

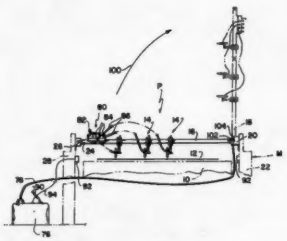
PAPER SCORING APPARATUS

Martin L. Hoy, 6409 63rd Pl., Riverdale, Md. 20737, and Aubrey B. Hurst, 6200 Westchester Dr., College Park, Md. 20740

Filed Nov. 4, 1988, Ser. No. 267,315

Int. Cl.[4] B31F *1/00, 1/36*

U.S. Cl. 493—396 **10 Claims**



1. A water scoring apparatus for paper or the like being moved through a machine comprising:

an elongated bar,

means supporting said bar in a substantially horizontal plane,

a needle assembly on said bar,

said needle assembly including a mounting lock engaging said bar,

a support bracket projecting from said block,

a needle holder carried by said bracket,

a hollow needle removably attached to said holder,

releasable means connecting said bracket to said block and said holder to said bracket and permitting relative position adjustment between said holder, bracket and block,

a supply container adapted to hold fluid,

flexible fluid transmission means communicating between said container and needle, and

control means operable to regulate the flow of fluid from said container to said needle;

said bar supporting means includes a bracket on the machine

and said bar includes one end pivotally attached to said machine bracket, whereby

said support bar is angularly displaceable from a horizontal position to an elevated position.

4,883,452

METHOD OF FABRICATING FROZEN FINE LIVER PIECES FOR ARTIFICIAL LIVER, APPARATUS FOR FREEZING THE SAME, AND FREEZING VESSEL

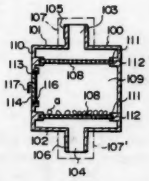
Yoichi Kasai, deceased (by Motoko Kasai, personal representative); Akio Kawamura; Yoshimi Nakanishi; Akira Kakita; Toshihiko Tsuburaya, all of Sapporo; Yasuo Kuraoka, and Nobuo Sakao, both of Ibaraki, all of Japan, assignors to Hoxan Corporation, Sapporo, Japan

Continuation of Ser. No. 661,469, Oct. 16, 1984, abandoned. This application Sep. 16, 1988, Ser. No. 245,925

Claims priority, application Japan, Mar. 2, 1984, 59-30260[U]; Mar. 16, 1984, 59-37534[U]; Mar. 16, 1984, 59-37533[U]; Mar. 17, 1984, 59-6172

Int. Cl.[4] A61B *19/00;* **F25D** *25/00*

U.S. Cl. 600—36 **2 Claims**



1. A method of fabricating frozen fine liver pieces for an artificial liver comprising:

cutting a liver removed from a human being or an animal, from which blood has been removed, into fine pieces of cubic shape and size of about 3 to 5 mm per side,

placing the liver fine pieces in a closed cavity, and

instantaneously freezing the liver pieces by introducing into the closed cavity at high speed and freezing velocity of about 1000 degrees C./min. helium gas evaporated directly from a source of liquid helium.

4,883,453

METHOD OF MANUFACTURING SYNTHETIC VASCULAR GRAFTS

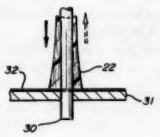
John P. Berry, Wirral, and David Annis, Bromborough, both of England, assignors to Ethicon Inc., Somerville, N.J. and The University of Liverpool

Filed Aug. 28, 1987, Ser. No. 90,312

Claims priority, application United Kingdom, Oct. 27, 1986, 8625679

Int. Cl.[4] A61F *2/04, 2/06;* **B32B** *31/00;* **F16L** *31/00*

U.S. Cl. 600—36 **4 Claims**



1. A method of manufacturing an aotro-coronary bypass graft comprising a partially cylindrical plate portion and at least one tube portion extending from said plate portion, said method comprising the steps of forming the plate portion, forming the tube portion, placing at least one hole in the plate portion, mounting the tube portion on a rigid tube or rod of external diameter adapted to pass snugly through the hole in the plate portion, applying adhesive to the end of the tube portion to be attached to the plate portion, passing the rigid rod or tube through the hole in the plate portion until the adhesive contacts the surface of the plate portion surrounding the hole and removing the rigid rod or tube once the plate portion and tube portion are secured together.

4,883,454

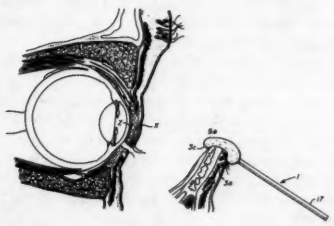
EYELID AND ANTERIOR ORBIT SWAB

Sol Hamburg, 9006 Abbeydale, Houston, Tex. 77031

Filed Sep. 4, 1987, Ser. No. 93,182

Int. Cl.[4] A61F *9/00, 13/00*

U.S. Cl. 604—1 **9 Claims**



1. An improved swab-type applicator for treatment of the eyelid margin inflammation due to meibomian gland dysfunction or other related infection comprising:

an upper blotting means

a lower blotting means,

each said blotting means being constructed of a lightweight, porous, sponge-like material capable of retaining its configuration when wet,

each said upper and lower blotting means characterized by an intermediary blotting means,

said intermediary blotting means consisting of a concave portion of compatible configuration to accommodate any two of the three surfaces of the lid margin so as to enable efficacious treatment by removal of the sebaceous debris or the like simultaneously from either the exterior surface and lower surface or the lower surface and anterior surface of said eyelid margin.

4,883,455

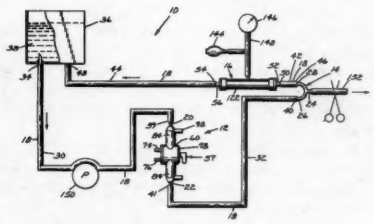
CARDIOPLEGIA ADMINISTRATION SET

Ronald J. Leonard, Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 13, 1988, Ser. No. 243,896

Int. Cl.[4] A61M *37/00*

U.S. Cl. 604—4 **34 Claims**



1. A cardioplegia administration set suitable for continually cooling and debubbling cardioplegia solution for delivery to a

patient's heart on demand at a predetermined pressure for injection into the heart, said administration set comprising:

A. a heat exchanger having an inlet and an outlet;

B. a bubble trap having an inlet and an outlet;

C. a three-end connector having one end adapted to connect to a cardioplegia solution injection catheter, one end comprising an inlet and one end comprising a recirculation outlet;

D. first tubing means having an inlet adapted to be connected to a source of cardioplegia solution and an outlet connected to the inlet of the three-end connector, said tubing means interconnecting the inlets and the outlets of the heat exchanger and the bubble trap therebetween so that a solution passageway is established from the source of cardioplegia solution through the heat exchanger and through the bubble trap to the end of the three-end connector adapted to connect to the injection catheter; and

E. a recirculation loop comprising:

1. a normally-closed, pressure-responsive valve having an inlet and an outlet; and

2. second tubing means having an inlet connected to the recirculation outlet of the three-end connector and an outlet adapted to be connected to the source of cardioplegia solution so that a solution passageway is established from the three-end connector through the normally-closed valve back to the source of cardioplegia solution when the valve is open.

4,883,456

ATTITUDE AND PRESSURE RESPONSIVE VALVE

John W. Holter, Valley Forge Circle 1000-619, King of Prussia, Pa. 19405

Filed Feb. 22, 1988, Ser. No. 158,695

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—9 **5 Claims**

1. A pressure and attitude responsive valve comprising;

a resilient hollow valve body,

an inlet opening in one end of said valve body for introduction thereinto of a pressurized fluid to be regulated,

a circular outlet opening in the opposite end of said valve body,

a ball larger in diameter than said outlet opening disposed within said valve body and adapted to open or close said outlet opening in accordance with the attitude of said valve body, and

at least one slit in said valve body adapted to open to permit fluid flow therethrough outwardly from said valve body upon occurrence of a predetermined pressure gradient across the valve body.

4,883,457

DISPOSABLE AND/OR REPLENISHABLE TRANSDERMAL DRUG APPLICATORS AND METHODS OF MANUFACTURING SAME

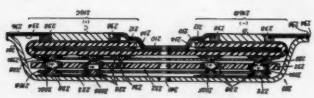
Dan Sibalis, Stony Brook, N.Y., assignor to Drug Delivery Systems Inc., New York, N.Y.

Continuation-in-part of Ser. No. 807,234, Dec. 10, 1985, Pat. No. 4,731,926, Continuation-in-part of Ser. No. 702,486, Feb. 19, 1985, abandoned, Continuation-in-part of Ser. No. 660,192, Oct. 12, 1984, Pat. No. 4,622,031, Continuation-in-part of Ser. No. 524,252, Aug. 18, 1983, Pat. No. 4,557,723. This application Jun. 5, 1987, Ser. No. 58,527

Claims priority, application Taiwan, Nov. 18, 1986, 75105482; Argentina, Nov. 20, 1986, 305963; European Pat. Off., Nov. 28, 1986, 86116547.0; Rep. of Korea, Nov. 28, 1986, 10126/86[U]; Australia, Dec. 3, 1986, 66193/86; Colombia, Dec. 5, 1986, 263611; Brazil, Dec. 9, 1986, PI8606062[U]; Canada, Dec. 9, 1986, 524873; Japan, Dec. 9, 1986, 61-293319; Mexico, Dec. 9, 1986, 4602; Venezuela, Dec. 10, 1986, 2160/86

Int. Cl.[4] A61N *1/30*

U.S. Cl. 604—20 **27 Claims**



1. A transdermal drug applicator for application to the skin of a patient which is electrically powered, comprising:

a flexible, non-conductive substrate having conductive coated areas which together form a single flexible member said flexible substrate defining first and second surfaces, and said conductive coated areas being on said first surface and forming drug reservoir electrodes, said flexible member being folded at about 180 degrees at each of two opposite ends to form top side and bottom side portions with the conductive coated areas providing electrical conductors between said top side and said bottom side portions, a plurality of separated drug reservoirs in electrical contact with said drug reservoir electrodes at said bottom side portions, a power source, including an electrical circuit, connected to said conductors at said top side portions for providing current to said plurality of drug reservoirs via said conductors and drug reservoir electrodes, electrical current conditioning means in said circuit with said power source and said drug reservoir electrodes, and a covering for said drug applicator enveloping and enclosing said flexible member, said power source and current conditioning means, and said plurality of drug reservoirs leaving a side of said drug reservoirs free for application.

4,883,458

ATHERECTOMY SYSTEM AND METHOD OF USING THE SAME

Samuel Shiber, Mundelein, Ill., assignor to Surgical Systems & Instruments, Inc., Mundelein, Ill.

Continuation-in-part of Ser. No. 18,083, Feb. 24, 1987, which is a continuation-in-part of Ser. No. 874,546, Jun. 16, 1986, Pat. No. 4,732,154, which is a continuation-in-part of Ser. No. 609,846, May 14, 1984, abandoned. This application Jun. 13, 1988, Ser. No. 205,479

Int. Cl.[4] A61B *17/32*

U.S. Cl. 604—22 **25 Claims**

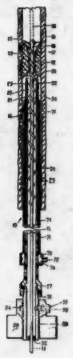
1. An atherectomy system for coring, ingesting and removing an obstruction from within a patient's vessel, comprising in combination:

a flexible guide-wire insertable into the vessel,

a flexible rotary catheter, rotatably disposed and insertable into the vessel over said flexible guide-wire, having at its

distal end a rotary coring means for making a circular cut in an obstruction located in front of it, and coupling means at its proximal end, and,

a continuous passage, for ingesting the cored obstruction



material, defined between said flexible rotary catheter and said flexible guide-wire, where the relative motion between said flexible rotary catheter and said flexible guide-wire assists in moving said ingested obstruction material proximally in said continuous passage.

4,883,459

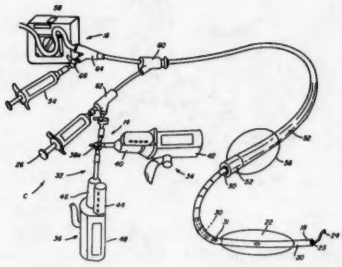
RETROGRADE PERFUSION

Reynaldo Calderon, 5620 Greenbriar #105, Houston, Tex. 77005

Continuation-in-part of Ser. No. 83,673, Aug. 12, 1987, Continuation-in-part of Ser. No. 871,528, Jun. 6, 1986, Pat. No. 4,714,460, Continuation of Ser. No. 518,685, Jul. 29, 1983, abandoned. This application Dec. 21, 1987, Ser. No. 139,065

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—28 **11 Claims**



5. A method for treating a tumor in the body of a patient with an active ingredient, comprising the steps of:

(a) placing a catheter having a suction lumen and an infusion lumen extending beyond the suction lumen and an infusion seal associated with the infusion lumen and a suction seal associated with the suction lumen in a vein of the patient near the tumor;

(b) sealing the flow of fluid in the patient's vein between the infusion lumen and the suction lumen with the infusion seal;

(c) injecting a carrier medium into the tumor from the infusion lumen at selected flow rates and pressures to establish preferential flow paths through the tumor;

(d) sealing the flow of fluid in the patient's vein past the suction lumen with the suction seal;

(e) injecting a carrier medium from the infusion lumen in a selected one of the established flow paths at a desired flow rate and pressure until steady state flow is established;

(f) injecting a second, less dense carrier medium from the infusion lumen in the selected one of the established flow paths;

(g) increasing the back pressure on the carrier medium when the second carrier medium is in the tumor to force the second carrier medium into interstitial spaces in the tumor at an attack site;

(h) injecting an active ingredient behind a carrier fluid into the patient's vein from the infusion lumen along the established flow path;

(i) increasing the back pressure on the carrier fluid and active ingredient when the active ingredient is at the attack site to force the active ingredient into interstitial spaces in the tumor so that the active ingredient is driven into the interstitial spaces in the tumor; and

(j) collecting the active ingredient in the suction lumen after perfusion through the tumor.

4,883,460

TECHNIQUE FOR REMOVING DEPOSITS FROM BODY VESSELS

Paul H. Zanetti, 5226 St. Andrews, Corpus Christi, Tex. 78413

Filed Apr. 25, 1988, Ser. No. 185,435

Int. Cl.[4] A61B *17/20*

U.S. Cl. 604—22 **11 Claims**

1. A method of removing relatively hard, abnormal deposits from a relatively soft vessel of a patient, comprising

inserting a catheter into the vessel from a location outside the patient,

inserting a flexible drive member having first and second ends and a cutting tool on the second end though the catheter and positioning the cutting tool adjacent the deposit, the cutting tool comprising an elongate member defining an axis having a lateral exterior surface extending along the axis and provided with a sharp cutting element; and

reciprocating the first end of the elongate member at a rate of 3,000–30,000 cycles per minute through a stroke of 0.01–5 millimeters, contacting the hard deposit with the cutting element on the lateral exterior surface and comminuting the hard deposits.

4,883,461

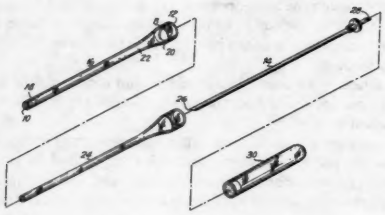
SAFETY NEEDLE SHEATH IN ANTI-REFLUX CATHETER HAVING NOVEL VALVE MEANS

Philip N. Sawyer, Brooklyn, N.Y., assignor to Interface Biomedical Laboratories Corp., Brooklyn, N.Y.

Continuation-in-part of Ser. No. 50,589, May 15, 1987, Pat. No. 4,784,644. This application Nov. 10, 1988, Ser. No. 269,829

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—53 **20 Claims**



1. A method for preventing needle-stick injuries when catheter means is introduced into or withdrawn from the vascular system of a patient during intravenous or intraarterial procedures as well as during disposal, storage or transportation of the catheter means which comprises:

providing a catheter means having fluid flow control means and needle-enveloping means, said fluid flow control means comprising: a tubular structure including input means and output means, each provided with an open bore constituting a flow channel; valve means located between the bores of said input and output means of said tubular structure and having an open and closed position, said valve means providing for a connecting channel between said bores when said further means is in the open position, said further means normally being prestressed to said closed position and being forcible to said open position in response to a positive fluid pressure in the bore of either of said input or output means, said valve means being constructed and arranged so as to return to said closed position in response to a removal of said positive fluid pressure from said bore containing same; said needle-enveloping means including obturating means inserted into said tubular structure so as to render said valve means incompetent, needle means inserted into said obturating means, and receptacle means releasably securable to one end of said needle means;

introducing the catheter means having said inserted obturating means and needle means into an organ or pleural cavity of a patient for removal of fluids therefrom;

retracting the needle means within the overlying obturating means so that the obturating means envelops said needle means; and

withdrawing simultaneously the retracted needle means and said obturating means with the needle means unexposed from within the tubular structure so that only said tubular structure remains in the organ or pleural cavity of said patient and said valve means remains competent in response to fluid reflux.

4,883,462

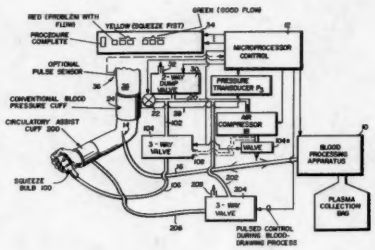
BLOOD EXTRACTION ASSIST APPARATUS AND METHOD

Warren P. Williamson, Huntingdon Beach, and Donald W. Schoendorfer, Santa Ana, both of Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 30, 1987, Ser. No. 8,753

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—53 **17 Claims**



5. Blood extraction assist apparatus comprising

a phlebotomy needle for fluid connection with a vein in a limb of a living body;

limb stimulus means adapted for tactile engagement with a lower portion of said limb for facilitating sustained venous blood flow to said needle when activated; and

control means connected to activate said stimulus means when sustained venous blood flow is to be facilitated.

4,883,464

MILKING EQUIPMENT

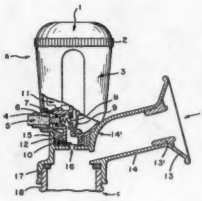
Yaso Morifuki, Osaka, Japan, assignor to Jex Co., Ltd., Osaka, Japan

Continuation of Ser. No. 110,545, Oct. 19, 1987, abandoned, which is a continuation of Ser. No. 783,245, Oct. 2, 1985, abandoned, which is a continuation-in-part of Ser. No. 517,999, Jul. 27, 1983, abandoned. This application Oct. 27, 1988, Ser. No. 266,205

Claims priority, application Japan, Aug. 10, 1982, 57-138756

Int. Cl.[4] A61M *1/06*

U.S. Cl. 604—74 **3 Claims**



1. A milking equipment comprising a suction assembly, a milk sucking section, and a bottle, said equipment is characterized in that a suction pressure adjusting screw and a pressure releasing button which works in cooperation with said pressure adjusting screw, are provided on the outside of the case of an electric type suction assembly, which includes batteries, such that the amount of air taken into an outer air intake portion through said pressure releasing button and a pressure shaft can be adjusted by turning said pressure adjusting screw, and an air sucking valve of the electric type suction assembly communicates with the outer air intake portion and an air intake which is provided at the lower portion of the suction

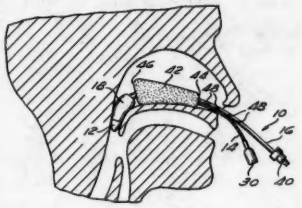
member, and said suction assembly milk sucking section equipped with an open trumpet at its side, and said bottle are connected vertically to communicate with each other.

4,883,465

NASAL TAMPON AND METHOD FOR USING

H. George Brennan, 1137 Granville, Newport Beach, Calif. 92660

Filed May 24, 1988, Ser. No. 197,835
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—96 **13 Claims**



1. An intranasal device for controlling nasal hemorrhaging without direct pressure, said device adapted for insertion into a nasal cavity during a nasal operation or other nasal procedure for (i) occluding the choanae to prevent blood and other fluids from flowing from the nose into the patient's throat, and (ii) expelling blood, mucous and other debris from the nasal cavity, without direct suctioning of the soft surrounding tissue, said device comprising:

an elongated tubular element, having mounted thereon a blunt, tapered guiding end, adapted to facilitate manipulation of said device within the nasal cavity;

an expansible low pressure sealing cuff, contiguous with said guiding end and adapted to be inflated by a source of pressurized fluid;

an inflation conduit, having a tubular passageway, for transmitting said pressurized fluid into and out of said expansible low pressure sealing cuff, so as to inflate and deflate said cuff, respectively;

a drainage conduit, adapted to be connected to a source of suction, said drainage conduit exhibiting a plurality of influent ports which enable blood, mucous, and other liquid debris to be suctioned from the nasal cavity; and

an absorptive member, adapted to enclose said influent ports of said drainage conduit so as to prevent soft tissue present in the nasal cavity from being suctioned into said influent ports and to evenly distribute said suction over substantially the entire surface area of said absorptive member.

4,883,466

NON-REUSABLE SYRINGE

Stephen C. Glazier, 211 E. 35th St. , Suite 8B, New York, N.Y. 10016

Filed Apr. 25, 1988, Ser. No. 185,975
The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—110 **22 Claims**

1. An improved non-reusable syringe comprising:

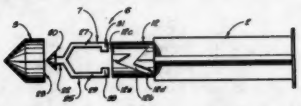
a barrel having one open end and one restricted end through which a fluid may pass;

a piston slidably positioned within said barrel, said piston forming a liquid-tight seal with the interior of said barrel;

a shaft slidable within said barrel, said shaft extending beyond one end of said barrel;

connector means having one end engaging said piston such that said connector means is rotatable relative to said piston; and

guide means formed on said shaft, said guide means receiving the other end of said connector means, said guide means for controlling the movement of said piston relative to the movement of said shaft, said guide means causing said connector means to disengage from said shaft.

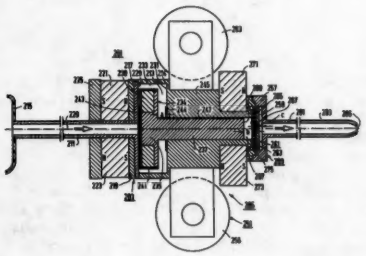


4,883,467

RECIPROCATING PUMP FOR AN IMPLANTABLE MEDICATION DOSAGE DEVICE

Manfred Franetzki, Uttenreuth; Georg Geisselbrecht, Erlangen; Gerhard Buchholtz, Erlangen; Werner Fickweller, Erlangen, and Peter Obermann, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 18, 1988, Ser. No. 182,723
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1987, 3713498
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—152 **11 Claims**



1. A reciprocating pump for an implantable medicaton dosage device comprising:

a housing have a fluid conveying passage with a piston consistig at least in part of magnetically attractive material and having a planar end face disposed in said passage, said passage terminating in an outlet;

first magnetic means for moving said piston in said passage through an output stroke to force fluid through said outlet;

second magnetic means for moving said piston in said passage through a return stroke;

a valve disposed at said outlet of said passage having a moveable element having a portion consisting of magnetic material;

a permanent magnet spring system disposed to act on said magnetic material portion of said moveable element for normally forcing said moveable element against said outlet to block fluid flow through said passage;

said moveable element of said valve having a planar surface disposed for pressing tightly adjacent said end face of said piston for at least a portion of said output stroke, at least one of said surface of said moveable element or said end face of said piston having a non-planar region; and

said piston assuming a rest position in said housing at an end of said return stroke with a distance between said end face of said piston and said surface, and said piston and said

passage being cooperatively dimensioned so that said output stroke is longer than said distance, thereby lifting said moveable element away from said outlet during said output stroke.

4,883,468

MEDICAL TOOL INTRODUCTION CANNULA AND METHOD OF MANUFACTURING THE SAME

Tadashi Kousai; Toshinobu Ishida, and Yousuke Moriuchi, all of Fuji, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

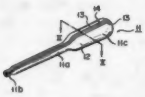
Filed Apr. 1, 1988, Ser. No. 176,601

Claims priority, application Japan, Apr. 8, 1987, 62-86251; Aug. 14, 1987, 62-202858

The portion of the term of this patent subsequent to Nov. 1, 2005, has been disclaimed.

Int. Cl.[4] A61M *5/00, 25/00*

U.S. Cl. 604—164 **17 Claims**



1. A medical tool introduction cannula for introducing a rod-like medical tool into a living body, said introduction cannula comprising:

a hollow tubular body made of a synthetic resin, a rod-like medical tool being insertable therethrough;

said hollow tubular body having at least one portion which comprises a strip member made of a material different from other portions of said hollow tubular body, said strip member extending longitudinally over substantially the entire length of said hollow tubular body; and

said strip member having a weld line formed therein, said weld line being bonded with a relatively weak force, and said weld line being longitudinally formed in said strip member to permit breaking of said strip member along said weld line in the longitudinal direction of said strip member.

4,883,469

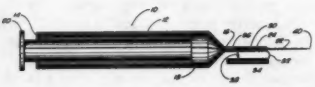
GUARD ASSEMBLY FOR HYPODERMIC NEEDLE

Stephen C. Glazier, 211 E. 35th St., Suite 8B, New York, N.Y. 10016

Filed Apr. 8, 1988, Ser. No. 179,434

Int. Cl.[4] A61M *5/32*

U.S. Cl. 604—192 **16 Claims**



1. The guard assembly for a hypodermic needle comprising:

a hinge means connected to said hypodermic needle at a location distal the pointed end of said hypodermic needle; and

guard means attached to said hinge means such that said guard means is movable relative to said hypodermic needle, said guard means having a receiving slot extending longitudinally through at least a portion of said guard means, said receiving slot opening through the wall transverse to the longitudinal axis of said guard means, said guard means for receiving the pointed end of said hypodermic needle, said guard means comprising:

a cylindrical member having a longitudinal V-cut narrowing from the wall to said receiving slot;

an end cap fixed to the end of said cylindrical member, said end cap covering the end of said longitudinal V-cut and said receiving slot; and

lock means formed within said receiving slot for retaining said hypodermic needle within said receiving slot.

4,883,470

SAFETY CAP

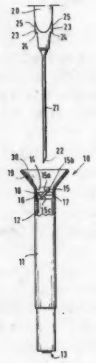
Hans Haindl, Melsungen, Fed. Rep. of Germany, assignor to B. Braun Melsungen AG, Melsungen, Fed. Rep. of Germany

Filed Sep. 20, 1988, Ser. No. 245,578

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 8712926[U]

Int. Cl.[4] A61M *5/32*

U.S. Cl. 604—192 **9 Claims**



1. A safety cap for connection with a cannula hub of a cannula, the cannula hub having a plurality of longitudinal wings, the safety cap comprising:

a substantially longitudinal sleeve having a tubular wall and an axial aperture,

an outwardly flared funnel extending from the axial aperture of the sleeve,

a plurality of radial projections on the inner surface of the longitudinal sleeve,

at least one of the radial projections comprising a slide flank inclined relative to the longitudinal axis of the sleeve and positioned to engage at least one of the longitudinal wings of the cannula hub during relative rotation of the cannula hub and the sleeve,

the radial projections being positioned so that the longitudinal wings of the cannula hub fit tightly to the inner wall surface of the sleeve between the radial projections when the safety cap and the cannula hub are in connection.

4,883,471

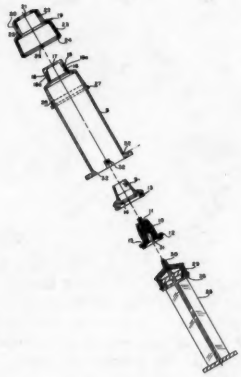
DISPOSABLE SHIELDED MEDICAL SYRINGE

Paul A. Braginetz, 214 Oak Ridge Cir.; Mark R. Leadbetter, 1926 Spring Hill Rd., and Joseph A. Peduto, Rte. 5, all of, Staunton, Va. 24401

Filed Aug. 16, 1988, Ser. No. 232,775

Int. Cl.[4] A61M *5/32*

U.S. Cl. 604—195 11 Claims



1. A disposable shielded medical syringe comprising a syringe barrel, a plunger slidably mounted in said barrel, a piston secured to the distal end of the plunger and being in sealing, sliding engagement with the inner wall of the barrel, a second piston slidably mounted in said barrel and being in sealing, sliding engagement with the inner wall of the barrel and being positioned between the distal end portion of the barrel and the plunger piston, a syringe needle extending outwardly longitudinally of the barrel at the distal end thereof, means for connecting the syringe needle to said second piston, vent means communicating the interior distal end portion of the barrel with the atmosphere, closure means for closing the communication of the interior distal end portion of the barrel with the atmosphere, and a medicament contained within the barrel between the plunger piston and the second piston, whereby when the vent means are closed the medicament is dispensed through the needle by pushing the plunger inwardly of the barrel, and when the vent means are open the second piston and associated contaminated needle is drawn inwardly to a shielded position within the barrel by pulling the plunger in a direction toward the proximate end of the barrel.

4,883,472

INJECTION DEVICE

Peter Michel, Burgdorf, Switzerland, assignor to Disetronic Ag., Burgdorf, Switzerland

Filed Jul. 31, 1987, Ser. No. 80,561

Claims priority, application Switzerland, Nov. 8, 1985, 04 805/85

Int. Cl.[4] A61M *5/24*

U.S. Cl. 604—208 16 Claims

1. A dispenser device for dispensing selectable amounts of liquid from an elongated cylindrical container (4) having a plunger (5) slidable forward therein from one end thereof for forcing liquid out of the container through an outlet in the opposite end of the container, comprising a drive mechanism (3) having an elongated rod member (12, 17), and a carrier element (20), and displacing means (10, 11, 26),

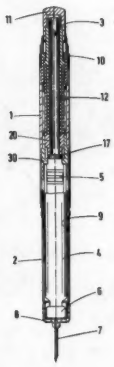
said carrier element (20) being displaceable forth and back in the advancing direction of the plunger (5),

said rod member (12, 17) connected to and carried by said carrier element (20) in such a way that it can be axially advanced with respect to the carrier element (20) in the advancing direction of the plunger (5) and is positively carried by the carrier element (20) in the forward as well as in the backward direction,

said displacing means (10, 11, 26) being connected on the one hand to advance the rod member (12, 17) with respect to the carrier element (20) and on the other hand to advance and retract the carrier element (20) together with the rod member (12, 17) carried thereby with respect to the container (4), the rod member (12, 17) being adapted to abut and force the plunger (5) forward during activation of said displacing means (10, 11, 26) for advancing the carrier element (20) together with the rod member (12, 17) with respect to the container (4),

housing means (1, 2), said cylindrical container (4) and said drive mechanism (3) connected in said housing means axially to each other, said displacing means (10, 11, 26) including a manually engageable element (11) extending from said housing means (1, 2), said rod member (12, 17) positioned to push the plunger (5) of the cylindrical container (4) forward and to move away from said plunger (5) leaving the latter in the forward pushed position,

said displacing means (10, 11) connected for axially displacing said carrier element (20) by a constant stroke (h) forth and back in the advancing direction of the plunger (5) from a rearward rest position in said housing means (FIG.



2; FIG. 9) to a forward position (FIG. 3) axially toward the plunger (5), and back again into the rest position (FIG. 2; FIG. 9),

said rod member (12, 17) on the one hand being axially advanceable by means of said displacing means (10, 11) with respect to said carrier element (20) in the advancing direction of the plunger (5) by any selected distance in correspondence with the plunger path, required for the desired quantity of liquid to be dispensed from said cylindrical container (4), and on the other hand said rod member (12, 17) being displaceable forth and back together with said carrier element (20) by said constant stroke (h) by said displacing means (10, 11),

whereby said rod member (12, 17) located at a distance from the plunger (5) in the rest position (FIG. 2; FIG. 9) of the carrier element (20) can be axially moved, by means of said displacing means (10, 11), relative to the carrier element (20) remaining in the rest position (FIG. 2; FIG. 9), in the advancing direction by the selected axial distance without abutting against the plunger (5), and abuts during actuation and displacement (h) of the carrier element (20) from the rest position (FIG. 2; FIG. 9) into the forward position (FIG. 3) against the plunger (5) at the moment, when the carrier element (20) has been axially displaced by the difference between the constant stroke (h) and the

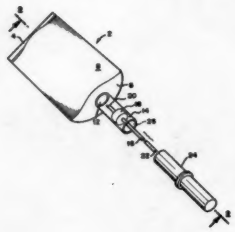
selected distance, when the displacement of the carrier element (20) is continued up to the forward position (FIG. 3), and means (26) connected to move said carrier element (20) and rod member (12, 17) away from the plunger (5) by the constant stroke (h) leaving the plunger (5) in the forward pushed position, while displacing the carrier element (20) back from the forward position (FIG. 3) into the rest position (FIG. 2; FIG. 9).

4,883,473

SINGLE USE INJECTION DEVICE

Ronny D. Thomas, Bellevue, Wash., assignor to Path, Seattle, Wash.

Continuation-in-part of Ser. No. 44,054, Apr. 29, 1987. This application May 27, 1988, Ser. No. 199,612
Int. Cl.[4] A61M *5/18, 5/32*
U.S. Cl. 604—217 1 Claim



1. A single-use disposable syringe for providing a medicament for injection into a patient, the syringe comprising:

a needle portion for injecting the medicament into the patient;

a main body portion for storing the medicament and for expelling the medicament into the needle portion, the main body portion including:

a compressible outwardly curved first end panel,

a compressible outwardly curved second end panel, and

a cylindrical bridging member, coupled to the first and second end panels, for separating the first and second end panels, to enable each of the end panels to become concave in response to complete compression of both of the end panels together; and

a neck portion coupled to the needle portion and to the main body portion for directing the medicament from the main body portion to the needle portion;

wherein the main body portion substantially collapses in response to complete compression of both of the end panels together to prevent the main body portion from being reformed and to expel the medicament out of the main body portion;

wherein in response to partial compression of both of the end panels together, the main body portion partially collapses to expel some of the medicament out of the main body portion; and

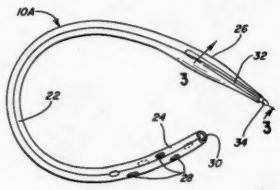
wherein the end panels, after partial compression of the end panels together and partial collapse of the main body portion, expand to reform the outwardly curved end panels of the main body portion, thereby drawing fluid into the main body portion and aspirating the needle portion.

4,883,474

THORACIC CATHETER

David S. Sheridan, Hook Rd., Argyle, N.Y. 12809, and Ralph D. Alley, Loudonville, N.Y., assignors to David S. Sheridan, Argyle, N.Y.

Continuation-in-part of Ser. No. 891,919, Jul. 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 885,477, Jul. 14, 1986, abandoned. This application Jun. 16, 1987, Ser. No. 62,844
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—280 28 Claims



1. A catheter having a distal end portion and a proximal end portion, comprising tubing of flexible material having a passageway extending from a distal end to a proximal end thereof and having at least one radial opening communicating with the passageway at the distal end portion thereof for draining a body cavity, at least a portion of the proximal end portion of the tubing tapering toward the proximal end thereof, a longitudinally facing opening aligned with the passageway in the tubing at the proximal end thereof, and sharpened stiffening means connected with the inside of the passageway at the proximal end portion of the tubing and projecting outwardly from the longitudinally facing opening, said stiffening means extending inwardly beyond said connection with the tubing into the passageway in the tubing, said stiffening means being spaced from the wall of the passageway in the tubing, said spacing extending from the connection of the tubing with the stiffening means to the inner end of the stiffening means, whereby pressure applied to the tubing and underlying stiffening means from inside the body cavity forces the stiffening means and the catheter proximal end portion outwardly through body tissue while simultaneously drawing the catheter distal end portion into the body cavity, whereupon the sharpened stiffening means can be severed from the catheter and the catheter distal end portion positioned in situ.

4,883,475

CHEMICALLY TREATED PAPER PRODUCTS—TOWEL AND TISSUE

Larry Bogart, Penn Valley; James J. Hipkins, Prospect Park, both of Pa., and Morris L. Smith, Lawnside, N.J., assignors to Scott Paper Company, Philadelphia, Pa.

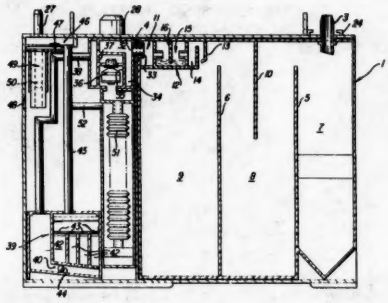
Division of Ser. No. 82,203, Aug. 6, 1987. This application Sep. 12, 1988, Ser. No. 243,923
Int. Cl.[4] A61K *7/40, 7/48*
U.S. Cl. 604—290 1 Claim

1. A method of simultaneously absorbing water or aqueous body fluids from the human skin while imparting to the skin an emollient effect by wiping the skin with a web of cellulosic fibers treated with an emollient composition consisting essentially of a water-soluble emollient, said emollient comprising glucose glutamate in an amount from 0.1 to 2% by weight of the web.

4,883,476
DRAINAGE DEVICE WITH DISPOSABLE COLLECTION CHAMBER

Leonard D. Kurtz, Woodmere, and Joseph LiCausi, Port Jefferson Station, both of N.Y., assignors to BioResearch, Inc., Farmingdale, N.Y.

Filed Jan. 7, 1988, Ser. No. 141,518
Int. Cl.[4] A61M *1/00*
U.S. Cl. 604—323 8 Claims

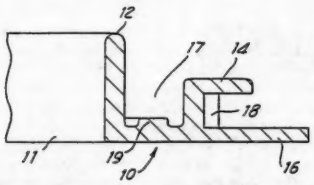


1. A drainage device comprising a nondisposable section and a disposable section, said disposable section comprising a collection chamber, a patient tube inlet in said collection chamber, an outlet passageway in said collection chamber to be connected to said nondisposable section, said nondisposable section including an inlet adapted to be connected to the outlet passageway from said disposable section, a suction outlet in said nondisposable section, a passageway from said inlet in the nondisposable section to said suction outlet, valve means in said passageway to prevent atmospheric air from passing into the collection chamber, suction control means in said passageway for regulating the degree of suction applied to the collection chamber, means in said passageway including a fluid retaining chamber in said nondisposable section in fluid communication with the outlet from said collection chamber for determining whether fluid from the collection chamber has passed into said nondisposable section and means including baffles in said disposable section for preventing contaminates in said collection chamber from entering said nondisposable section.

4,883,477
OSTOMY APPLIANCE

Peter L. Steer, Surrey, England, assignor to E. R. Squibb and Sons, Inc., Princeton, N.J.

Filed Apr. 15, 1988, Ser. No. 182,274
Claims priority, application United Kingdom, May 22, 1987, 8712190
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—339 4 Claims



1. An ostomy appliance which includes four separate annular parts of which a first part is attachable to the body of the wearer by a pad of medical grade adhesive and is also attachable to a third part by rotating a second part comprising a rotatable locking ring from a non-locking position to a locking position, the second part also being attachable to the third part, and the third part is itself attachable to the fourth part in a push-fit manner, the fourth part connected to the ostomy bag, said second, third and fourth parts being attachable as an assembly separate from attachment to said first part.

4,883,478
PROCESS FOR PREPARING A LIQUID-ABSORBING COMPOSITION

Eric Lerailler, Lognes; Michel Pierre, Mulhouse; Bernard Thiriet, Juvisy s/Orge, and Jean Wacquez, Courbevoie, all of France, assignors to Beghin-Say, S.A., Thumeries, France

PCT No. PCT/FR86/00398, § 371 Date Sep. 21, 1987, § 102(e) Date Sep. 21, 1987, PCT Pub. No. WO87/03208, PCT Pub. Date Jun. 4, 1987
PCT Filed Nov. 21, 1986, Ser. No. 88,110
Claims priority, application France, Nov. 22, 1985, 85 17351
Int. Cl.[4] A61F *13/16, 13/18, 13/20*
U.S. Cl. 604—360 11 Claims

1. A process for the preparation of a composition which absorbs large quantities of liquids comprising the steps of

(a) providing a concentrated solution of a saccharide in water;

(b) adding a pre-determined quantity of a hydrophilic water-insoluble, water-swellable polymer to the solution of step (a);

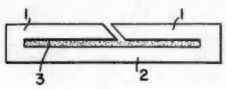
(c) kneading of the composition of step (b) to provide a homogeneous paste; and

(d) drying the paste of step (c) to adjust the water content to a value ranging between about 2 and 15% water.

4,883,479
ABSORBENT NAPKIN, PARTICULARLY FOR INFANT'S DIAPER PADS

Jean P. Piron, Thoissey, and Jean C. Daugan, Bougival, both of France, assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Sep. 26, 1986, Ser. No. 912,759
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—365 4 Claims



1. An absorbent article comprising a base sheet of fluid impervious material, a top sheet of fluid pervious non-woven material, said sheets being connected to each other about the periphery, and an absorbent pad disposed between said top sheet and said base sheet, said absorbent pad having a central portion and two side panels, said side panels being folded under said top sheet and over said central panel, and a binder on said central panel securing said side panels to said central panel to render said absorbent pad more absorbent, said absorbent pad including a wadding sheet, said binder penetrating said wadding sheet binding said side panels to said central panel.

4,883,480

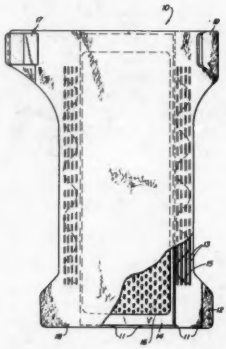
INFANT DIAPER WITH IMPROVED FIT

Gloris M. Huffman, Skillman, and Heinz A. Pieniak, No. Brunswick, both of N.J., assignors to McNeil-PPC, Inc., Milltown, N.J.

Continuation of Ser. No. 42,501, Mar. 27, 1987, abandoned, which is a continuation-in-part of Ser. No. 838,878, Mar. 10, 1986, abandoned, which is a continuation of Ser. No. 641,666, Aug. 17, 1984, abandoned. This application Jan. 17, 1989, Ser. No. 296,992

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—385.1 **1 Claim**



1. A disposable infant diaper having a modified "T" configuration comprising:

(a) a substantially rectangular absorbent core, said core comprising a substantially rectangular absorbent panel superimposed on a liquid barrier, said barrier being substantially the same shape as said panel but extending slightly beyond each edge of said panel, said core forming the stem of the "T " and extending substantially the entire length of the "T";

(b) a first breathable fabric underlying the absorbent panel and liquid barrier and forming the top of the "T" and extending beyond the stem of the "T" to form margins, said first breathable fabric being vapor permeable but liquid impermeable;

(c) a second breathable fabric covering said absorbent core and extending beyond said core at least sufficiently to be adhered to said first breathable fabric in the margins, said second breathable fabric being both liquid and vapor permeable;

(d) at least one of said breathable fabrics extending beyond the edges of the absorbent core at the base of the "T" in substantially equal portions, said extensions at the base of the "T" being substantially less than the extensions of the first breathable fabric at the top of the "T";

(e) elastic gathering means secured between said first and second breathable fabrics in said margin along the stem of the "T" at least in the central portion thereof;

(f) closure means attached on the inside of each terminating end of the top of the "T", both of said breathable fabrics being substantially nonextendable in a crosswise direction; and

(g) said disposable diaper having dimensions wherein the length of the "T" configuration A is x, the width across the top of the "T" B is about 0.8x, the width of the base of the stem of the "T" C is from about 0.5x to about 0.55x, the width of the stem of the "T" D at the transverse axis at the center of the length of the product is from about 0.45x to about 0.50x, the length of the panel E is about 0.9x, the width of the panel F is about 0.25x, the length of the elastic is about 0.65x, said elastic length being distributed about 55 percent above the transverse axis and about 45 percent below the transverse axis, and said elastic width being at least about 0.5 inch, and said closure longitudinal length I is at least about 0.08x and the terminating ends of the top of the "T" H are about 0.1x.

4,883,481

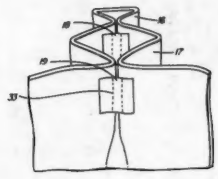
ADJUSTABLE DISPOSABLE PANTY

JoAnn Blanchard, Apt. 101, 1423 Yonge St., Toronto, Ontario, Canada K1P 5W6

Filed Sep. 9, 1988, Ser. No. 242,225

Int. Cl.[4] A41B *9/00, 9/12*

U.S. Cl. 604—385.1 **1 Claim**



1. A human undergarment in the form of a panty formed of a flexible sheeting material and having a waistband region and a central crotch-covering region wherein a first pleat is formed of said waistband region, said first pleat being held closed by a frangible tab, and wherein a second pleat held closed by a frangible tab is formed within said first pleat.

4,883,482

NAPKIN-KNICKERS PROVIDED WITH AN IMPROVED ELASTIC ARRANGEMENT

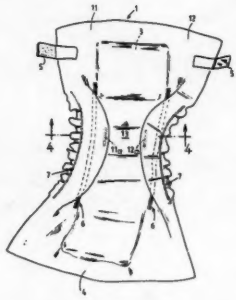
Jean-Francois Gandrez, Sainte Honorine, and Jean-Claude Daugan, Bougival, both of France, assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 23, 1985, Ser. No. 797,067

Claims priority, application France, Dec. 11, 1984, 84 17219

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—385.2 **3 Claims**



1. A diposable napkin-knickers having a generally rectangular shape and comprising a flexible and impermeable support sheet, an absorbent wad disposed on the support sheet and a flexible and permeable upper sheet covering the absorbent wad, the upper sheet being fixed in at least a part of its periphery to the support sheet, two distinct systems of elastic bands extending longitudinally in at least a part of the length of said napkin-knickers, the first system comprising two elastic bands disposed between said wad and said support sheet one hand near each edge of said wad so that said wad cushions said first system of elastic bands, said first system imparting an anatomical shape to said napkin-knickers, said second system compris-

ing two elastic bands disposed along the opposite edges of said napkin-knickers so as to ensure fluid tightness thereof when worn by the user, the bands of said first elastic system being substantially wider than the bands of said second elastic system, the material of said bands of said second elastic system being more stretchable than the material of said bands of said first elastic system, the bands of said second elastic system having greater than fifty and less than eighty percent of their length located in the near part of said napkin-knickers measured from a median transverse axis perpendicular to the longitudinal direction of said napkin-knickers.

4,883,483

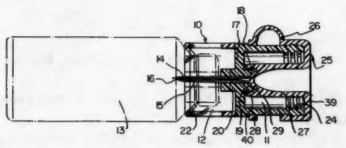
MEDICINE VIAL ADAPTOR FOR NEEDLELESS INJECTOR

Istvan Lindmayer, Pierrefonds, Canada, assignor to Advanced Medical Technologies Inc., Charlottetown, Canada

Continuation of Ser. No. 24,535, Mar. 11, 1987, abandoned, which is a continuation of Ser. No. 797,529, Nov. 13, 1985, Pat. No. 4,662,878. This application Apr. 14, 1988, Ser. No. 183,449

Int. Cl.[4] A61B *19/00*

U.S. Cl. 604—411 **5 Claims**



1. A disposable plastic adaptor for connecting a medicine vial to a needleless injector comprising

a hollow, generally cylindrical body member having a top end and a bottom end,

a wall dividing said hollow body into a generally cylindrical top end cavity and bottom end cavity, said bottom end cavity being adapted to slide over the top end of a medicine vial, said cavity wall including a plurality of detents which prevent removal of the adaptor from the vial, and said top end cavity being adapted to be twist connected to the end of a needleless injector and a fluid connector member mounted within said body member composing a sharp tipped, hollow probe extending axially downwardly within said bottom and cavity and an axial projection with a concave and face extending axially upwardly within said top end cavity and an axial bore extending through said fluid connector member to flow connect said concave end face and the probe tip, said probe being adapted to penetrate the top of a medicine vial and said concave end face being adapted to provide fluid tight seal with the convex end of a cylindrical medicine reservoir within said needleless injector, and

a protective cap member for protecting said top end cavity when the adaptor is not connected to a needleless injector, said protective cap comprising an end portion adapted to snugly close the top end of said adaptor and having an inner cylindrical projection extending axially from the end portion, said cylindrical projection having at the end thereof remote from said cap end portion a cylindrical skit with convex end face recessed within said skirt, said convex end face being adapted to provide a fluid tight seal with the concave end face of said top end cavity axial projection and said skirt being adapted to protect said convex end face.

4,883,484

DELIVERY DEVICE

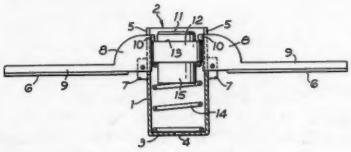
Michael T. Shepherd, Coopers Animal Health Limited Berkhamsted Hill, Berkhamsted, Hertfordshire, England, and Scott R. Edwards, 71, Epping Road, North Ryde, New South Wales, 2113, Australia

Filed Dec. 2, 1987, Ser. No. 127,757

Claims priority, application United Kingdom, Jun. 17, 1986, 8614716; Australia, Jul. 15, 1986, PH 06936; European Pat. Off., Nov. 3, 1987, 87309709.1

Int. Cl.[4] A61M *31/00*

U.S. Cl. 604—891.1 **18 Claims**



1. An intra-ruminal depot adapted to be retained in the rumen of a ruminant animal which comprises:

a main portion comprising an elongate body for containing and progressively releasing a veterinary substance;

a plurality of elongate members hingedly attached thereto and movable between a compact position wherein the spread of the depot is minimized and an extended position wherein the spread of the device is maximized, each elongate member being constituted by a respective wing pivotally attached at one end thereof to a leading end of the body, each wing being resiliently biased to pivot from the said compact position wherein the wing lies alongside the body for passage down the esophagus of the animal to the said extended position wherein the wing projects laterally outwards from the body, thereby retaining the depot in the rumen;

biasing means operatively mounted on the body to bias the elongate members to the extended position;

stop means operatively mounted on the body to prevent hinged movement of each elongate member beyond the said extended position; and

locking means carried on the body and operative between each elongate member and the body for locking the wings in the said extended position and preventing any subsequent pivotal movement away from the said extended position.

4,883,485

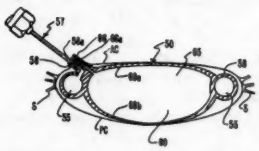
EXPANDABLE LENS REPLACEMENT

Jayant K. Patel, 25 S. Raymond, #204, Alhambra, Calif. 91801

Filed May 15, 1987, Ser. No. 50,084

Int. Cl.[4] A61F *2/16*

U.S. Cl. 623—6 **5 Claims**



1. A method for implanting synthetic lenses into the natural capsular bag of a human eye, comprising the steps of:

making an incision in the said eye communicating into the interior of said capsular bag;

evacuating the natural lens substance from said capsular bag through said incision;

inserting a collapsed, expandable lens insert into a hollow needle, said lens insert including an exterior toroidal cavity formed at the periphery of a substantially circular lens cavity;

expelling said lens insert from said hollow needle through said incision into said evacuated capsular bag;

pressuring by injecting liquid under pressure into said torroidal cavity; and

expanding by liquid pressure said lens cavity.

4,883,486

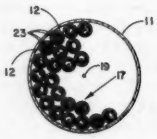
PROSTHETIC LIGAMENT

Indu Kapadia, 33 Front St., Denville, N.J. 07834, and Kemal Schankereli, 7979 Neal Ave. N., Stillwater, Minn. 55082

Filed May 31, 1988, Ser. No. 200,427

Int. Cl.[4] A61F *2/08*

U.S. Cl. 623—13 17 Claims



1. A ligament prosthesis for implanting in situ in a body, comprising:

an elongated tubular porous sheath made of PTFE yarn;

an unwoven non-braided core within said sheath, said core comprising a plurality of linearly arranged high tenacity strands of polyester running generally parallel to one another and to the central axis of said sheath;

said core being anchored to said sheath with a stitching of multifilamentous synthetic thread passing through said sheath and said core.

4,883,487

METHOD OF PRODUCING AN ARTIFICAL SKIN

Katsutoshi Yoshizato, Ebina; Toshio Taira, Yokohama, and Teruo Miyata, Tokyo, all of Japan, assignors to Koken Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1987, Ser. No. 34,958

Claims priority, application Japan, Apr. 19, 1986, 61-91022

Int. Cl.[4] A61F *2/10*

U.S. Cl. 623—15 3 Claims

1. A method of producing an artificial skin comprising:

(a) pouring an acidic atelocollagen solution into a mold to a depth of 1 to 5 mm;

(b) air-drying said poured atelocollagen solution to form a dry sheet;

(c) cross-linking said dry sheet by ultraviolet irradiation for a time sufficient to form an insoluble atelocollagen sheet;

(d) inoculating epidermal cells on one surface of said atelocollagen sheet; and

(e) suspending the inoculated atelocollagen sheet in a liquid culture medium to culture said epidermal cells, thereby forming an epidermal cell layer.

4,883,488

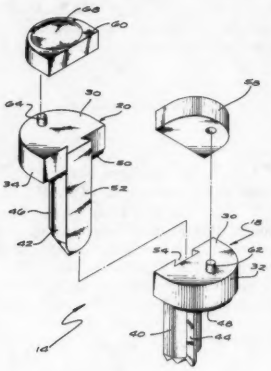
TIBIAL COMPONENT FOR A KNEE PROSTHESIS

Roy D. Bloebaum, Salt Lake City, Utah; Frank P. Magee, Phoenix, and Thomas P. Murray, Scottsdale, both of Ariz., assignors to Harrington Arthritis Research Center, Phoenix, Ariz.

Filed Jun. 13, 1988, Ser. No. 206,045

Int. Cl.[4] A61F *2/38*

U.S. Cl. 62.3—20 14 Claims



1. In a tibial component for a knee prosthesis, the improvement comprising:

a tibial platform defining by medial and lateral tibial tray members;

means for interconnecting said medial and lateral tibial tray members to permit shifting therebetween constrained substantially to a single axis; and

a pair of meniscal bearing components mounted respectively on said medial and lateral tibial tray members.

4,883,489

PELVIS PART PROSTHESIS

Hans Grundei, Lübeck; Erwin Hipp, and Bernd Heinhuber, both of Munich, all of Fed. Rep. of Germany, assignors to S&G Implants GmbH, Lübeck, Fed. Rep. of Germany

PCT No. PCT/DE87/00387, § 371 Date Apr. 29, 1988, § 102(e) Date Apr. 29, 1988, PCT Pub. No. WO88/01491, PCT Pub. Date Mar. 10, 1988

PCT Filed Aug. 29, 1987, Ser. No. 192,518

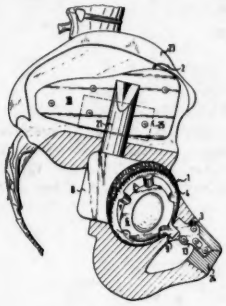
Claims priority, application Fed. Rep. of Germany, Sep. 2, 1986, 3629799

Int. Cl.[4] A61F *2/34*

U.S. Cl. 623—22 3 Claims

1. Pelvis part prosthesis for replacement of a pelvis section in the area of the hip joint of a human being, comprising a shell portion for the reception of an artificial hip joint ball and two connection elements mechanically joined to the shell portion for securing the prosthesis in the areas of the os pubis and the ilium, respectively, characterized in that the shell portion is formed as a hollow metal hemisphere having two outer integrally formed appendices spaced about said hemisphere at positions near the os pubis and the ilium, each having a conically formed reception bore, and that said two connection elements comprise metal plates which are formed such to adapt securing faces to remaining bone material of the os pubis and ilium, respectively, and which are provided with holes for

receiving screws on said securing faces, and pin means having conically formed ends to be secured in respective conically



formed reception bores of said appendices by means of a self-locking tight fit.

4,883,490

ACETABULAR CUP

Indong Oh, 851 Lyndon St., S. Pasadena, Calif. 91030

Continuation-in-part of Ser. No. 340,024, Jan. 18, 1982, Pat. No. 4,437,193. This application Mar. 7, 1984, Ser. No. 587,311

Int. Cl.[4] A61F *2/34*

U.S. Cl. 623—22 14 Claims

1. An acetabular cup of approximately hemispherical configuration adapted for implantation in the acetabulum, said acetabular cup having an outer surface with a generally part-spherical contour and an inner concave being surface adapted to receive a femoral head said outer surface having a plurality of grooves defining segments on the outer surface, said grooves being adapted to receive and interlock with a cement for affixing the acetabular cup within the acetabulum, at least one of said grooves having at least one undercut which defines an overhanging flange whereby the cement can be received in said one groove behind the flange to interlock with the flange and tend to resist loosening of the acetabular cup from the acetabulum, said grooves including a plurality of latitude grooves and said one groove is the latitude groove which is most remote from a polar region on the acetabular cup, each of at least some of said segments having at least one spacer lug on the outer surface thereof to assist in positioning the acetabular cup in the acetabulum.

4,883,491

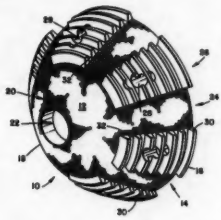
POROUS-COATED ARTIFICIAL JOINTS

Thomas H. Mallory, Columbus; Timothy McTighe, Chagrin Falls, both of Ohio, and Douglas G. Nolles, New Canaan, Conn., assignors to Joint Medical Products Corporation, Stamford, Conn.

Continuation of Ser. No. 820,772, Jan. 21, 1986, abandoned. This application Oct. 6, 1988, Ser. No. 256,126

Int. Cl.[4] A61F *2/34*

U.S. Cl. 623—22 8 Claims



1. A prosthesis comprising a cup for use as part of an artificial ball and socket joint, said cup having a spherically-shaped outside surface upon which is formed a screw thread for engagement with bone, said outside including a dome portion and a base portion, the dome portion being porous-coated and the base portion including (a) the screw thread and (b) a plurality of porous-coated columns which extends from the dome portion into the region of the base of the cup where the cup is of greatest width, the outer surface of the porous-coated column lying substantially on the same sphere as the outer surface of the porous-coated dome, said screw thread being free of porous coating and being interrupted by the porous-coated columns so as to produce an alternating pattern of threaded columns adjacent to porous-coated columns, the threaded columns providing initial mechanical fixation of the prosthesis to the bone and the porous-coated columns allowing long-term fixation through bone ingrowth and remodeling.

4,883,492

METAL BONE IMPLANT

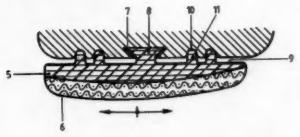
Otto Frey, Winterthur, and Rudolf Koch, Berlingen, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 26, 1988, Ser. No. 198,397

Claims priority, application Switzerland, Jun. 23, 1987, 2363/87

Int. Cl.[4] A61F *2/36*

U.S. Cl. 623—23 7 Claims



1. A hip joint implant comprising:

a blade-like shank of metal having at least one depression therein;

a plastic part having a body portion spaced from said shank at least one prop extending from said body portion into said depression with a lateral clearance therein to support said body portion in elastically displaceable manner relative to said shank and at least one elastic projection extending from said body portion to against said shank; and

a metal grid structure mounted on said plastic part opposite said shank for ingrowth of bone tissue.

4,883,493

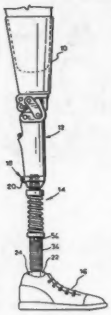
LEG PROSTHESIS

Guy G. Martel, 350 The Driveway, Apt. #1205, Ottawa, Ontario, Canada K1S 3N1 , and Edwin A. Iler, 32 Gray Court Drive, Ancaster, Ontario, Canada L9G 2S1

Continuation of Ser. No. 802,911, Nov. 29, 1985, abandoned. This application Apr. 13, 1988, Ser. No. 181,609

Int. Cl.[4] A61F *2/80*

U.S. Cl. 623—38 **8 Claims**



1. A running prosthesis for use by a leg amputee amputated below the knee and having a leg stump and a natural leg, the prosthesis comprising:

attachment means for connecting the prosthesis to said stump;

a shank having upper and lower ends and being coupled at said upper end to the attachment means;

a foot for engagement with the ground and coupled to said lower end of the shank; and

said shank comprising a first part defining said upper end and a second part telescopically engaged with the first part and defining said lower end, resilient means engaged between said parts to bias the parts away from one another and into a relationship corresponding to the full length of the prosthesis whenever the prosthesis does not support the amputee, the resilient means being responsive to end loading in the shank to allow the first and second parts to move relative to one another to reduce the length of the prosthesis and so store potential energy in the prosthesis so that during running movements when the amputee is supported by the prosthesis the amputee can move his natural leg forwardly past the prosthesis with minimal vertical movement of the amputee's centre of gravity, the amputee further being propelled upwardly and forwardly as the weight of the amputee is transferred from the prosthesis to his natural leg and the potential energy stored in the prosthesis is released.

4,883,494

SHIFT DEVICE FOR A PROSTHETIC LIMB

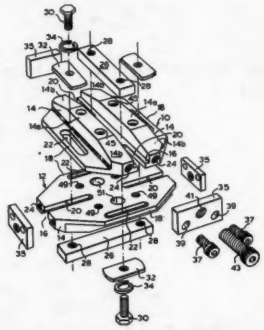
John E. Cooper, Leatherhead, United Kingdom, assignor to J. E. Hanger & Company Limited, London, England

Filed Nov. 19, 1987, Ser. No. 122,742

Claims priority, application United Kingdom, Nov. 21, 1986, 8627952

Int. Cl.[4] A61F *1/02*

U.S. Cl. 603—39 **14 Claims**



1. A shift device for a prosthetic limb, comprising:

first and second plates having adjoining flat faces in sliding contact;

an elongated slideway extending across an outer face of each plate and ending at respective edges of the plate;

guiding means for guiding the slideways of the first and second plates for movement generally at right angles to one another, said guiding means including first and second bars slideably received in a respective slideway;

means in each slideway defining at least one longitudinal slot whose length permits limited relative translational movement of the plates; and

a clamping screw located freely in each slot of each of the first and second plates and engaging the guide bar in the slideway of the other plate, said clamping screw being releasable to allow relative movement of the plates and on re-tightening immobilising the plates.

CHEMICAL

4,883,495
AMINO-CONTAINING ALKENYLSUCCINIC ESTERS

Lothar Jaeckel, Flörsheim am Main; Rolf Kleber, Neu-Isenburg, and Bernhard Mees, Eppstein, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

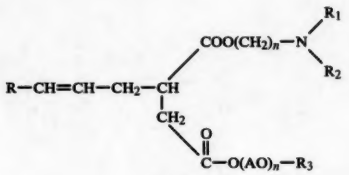
Filed Sep. 21, 1988, Ser. No. 247,277

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732340

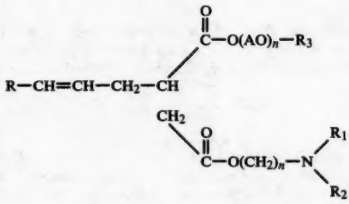
Int. Cl.[4] D06M *9/00*; C07C *69/593*

U.S. Cl. 8—115.6 9 Claims

1. A compound of the formulae



or



where R denotes linear or branched C_1–C_{20}-alkyl, R_1 denotes hydroxy-C_2–C_6-alkyl or C_1–C_4-alkyl, R_2 denotes methyl or ethyl, R_3 denotes C_6–C_{20}-alkyl, or C_6–C_{20}-alkenyl, A denotes —C_2H_4— or —C_3H_7— and n denotes a number from 1 to 10.

9. A spin-finish composition containing an effective amount of a compound of claim 1 and at least one additional spin-finish component.

4,883,496
PROCESS FOR DYEING CRYSTALLINE AROMATIC POLYAMIDE FIBERS WITH WATER-INSOLUBLE DYES

Hamid M. Ghorashi, Midlothian, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 156,694, Feb. 14, 1988, abandoned. This application Dec. 30, 1988, Ser. No. 290,870

Int. Cl.[4] D06P *5/00, 7/00*

U.S. Cl. 8—476 6 Claims

1. A process for dyeing a tow of crystalline poly-(m-phenylene isophthalamide) filaments comprising the steps of:

padding onto the surface of the filaments of the tow an aqueous dispersion of 1 to 20 wt. % of a water-insoluble dye material having a dye-activation temperature at or less than about 130° C. and below the glass transition temperature of poly(m-phenylene isophthalamide),

heating the tow with steam to a temperature below the glass transition temperature of the poly(m-phenylene isophthalamide) but above the dye-activation temperature to activate the dye material on the surface of the filaments of the tow, and thereafter

heating the tow with steam to a temperature above the glass transition temperature of the poly(m-phenylene isophthalamide) but no more than about 165° C. to diffuse substantially all of the dye material into the filaments of the tow.

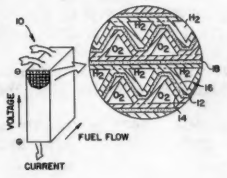
4,883,497
FORMATION OF THIN WALLED CERAMIC SOLID OXIDE FUEL CELLS

Terry D. Claar, Tisle; Donald E. Busch, Hinsdale, and John J. Picciolo, Lockport, all of Ill., assignors to Arch Development Corporation, Chicago, Ill.

Filed Mar. 28, 1988, Ser. No. 174,146

Int. Cl.[4] H01M *8/10*

U.S. Cl. 29—623.5 22 Claims



1. A method for forming an SOFC comprising the steps of:

dispersing each of four ceramic powders into respective ones of a plurality of liquid media to form four slips of an anode, a cathode, an electrolyte and an interconnect;

milling a binder and a plasticizer into each of said four slips;

casting the four slips into thin layers or tapes;

forming a plurality of said tapes into a stacked array including the step of depositing an intermediate bonding layer between adjacent tapes, wherein said intermediate layers are comprised of portions of each of the adjacent layers between which the intermediate layer is disposed;

forming a plurality of corrugations in the stacked array of tapes, wherein said corrugated stacked array is self-supporting; and

heating the stacked array of tapes at an elevated temperature so as to increase the density of electrolyte and interconnect tapes, form bonds between adjacent tapes, and rigidify and increase the strength of the stacked array of tapes.

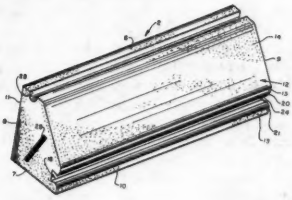
4,883,498
ARTIFICIAL FIRELOG

John E. MacIsaac, Beloit, Ohio, assignor to Sebring Forest Industries, Inc., Sebring, Ohio

Filed Jul. 1, 1988, Ser. No. 214,495

Int. Cl.[4] C10L *11/06*

U.S. Cl. 44—532 11 Claims



1. An artificial firelog including, an elongated flammable body formed of compressed particulate material and a binder, said body having a front surface; generally dovetailed-shaped groove means formed in the front surface by spaced upper and lower inwardly extending surfaces, and groove means extending throughout the length of the body for creating venturi air currents along said groove means to facilitate ignition of said body, said upper surface of the groove means forming an included angle of less than 90 degrees with the front surface and forming an upper edge therebetween; and a protective wrapper formed of a flammable material enclosing the elon-

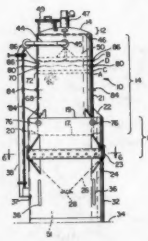
gated body, said wrapper generally conforming to the external configuration of said body, whereby when said wrapper is ignited the flames will burn through the wrapper and easily ignite the upper edge of the groove means and create a turbulent air current along the entire groove means for subsequently spreading the flame along the upper edge and for igniting said front surface.

4,883,499

PROCESS ADAPTED TO PRODUCE SYNTHESIS GAS AND ACTIVATED CARBON FROM ORGANIC INPUT MATERIAL

Frederick P. Beierle, 1442 Sunset Dr., Prosser, Wash. 99350, and Mounir Mazzawi, 36 Fairlawn Rd., Weymouth, Mass. 02191

Filed May 6, 1988, Ser. No. 191,209
Int. Cl.[4] C10B *49/06*; C10J *3/14*; C01B *31/10*
U.S. Cl. 48—203 **4 Claims**



1. A process adapted to produce synthesis gas and activated carbon from organic input material, comprising the steps of:

establishing a synthesis gas production bed having a top and a bottom and a selected diameter in a closed gasifier reaction chamber to produce synthesis gas which exits the gas production bed at a selected point, the gas production bed comprising in sequence an upper layer of organic input material, first and second intermediate pyrolysis layers, in which the organic input material is gradually reduced to charcoal and volatiles are released from the organic input material, including hydrogen, carbon monoxide, methane, water vapors and tars, and a lower layer of substantially tar-free charcoal, wherein the first intermediate layer is at a temperature within a first range of 400° to 500° C. in which the organic input material is carbonized and the second intermediate layer is at a temperature within a second range of 850° to 950° C. in which the organic input material is partially oxidized and is substantially surrounded by carbon dioxide, and wherein the lower layer includes an upper portion which is at a temperature within a third range of 850° to 950° C., wherein substantially all the volatiles from the first and second intermediate layers are reduced to carbon monoxide, methane and hydrogen, wherein the distance between the first intermediate layer and the selected point where the synthesis gas exits from the gas production bed is approximately 1.5 times the diameter of the gas production bed but not less than approximately seven feet and wherein the organic input material has a residence time in the second intermediate layer and the lower layer of approximately six to ten hours;

adding additional organic input material to the reaction chamber in an amount sufficient to maintain the upper layer of the gas production bed;

moving air down through the gas production bed in a controlled amount so as to maintain the temperatures of the first and second intermediate layers and the lower layer within the first, second and third ranges, respectively; and

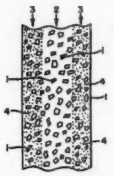
removing charcoal from the bottom of the gas production bed, wherein charcoal so removed is activated carbon, having an iodine number of at least 500.

4,883,500

SAWBLADE SEGMENTS UTILIZING POLYCRYSTALLINE DIAMOND GRIT

Martin E. Deakins, Dublin; David E. Slutz, Worthington; Neil R. Johnson, Columbus; Thomas J. Clark, Powell, and Harold P. Bovenkerk, Worthington, all of Ohio, assignors to General Electric Company, Worthington, Ohio

Filed Oct. 25, 1988, Ser. No. 262,405
Int. Cl.[4] C09K *3/14*
U.S. Cl. 51—298 **18 Claims**



1. A cutting segment for use in a saw blade, comprising thermally stable polycrystalline diamond cutting elements and single crystal diamond cutting elements dispersed in a bonding matrix.

4,883,501

ALUMINA BONDED ABRASIVE FOR CAST IRON

Douglas G. Haynes, Jr., Grand Island, N.Y., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 666,131, Oct. 30, 1984, Pat. No. 4,800,685, which is a continuation of Ser. No. 615,663, May 31, 1984, abandoned, which is a continuation of Ser. No. 536,830, Sep. 30, 1983, abandoned, which is a continuation of Ser. No. 331,442, Dec. 16, 1981, abandoned. This application Sep. 19, 1988, Ser. No. 245,589
Int. Cl.[4] B24D *3/02*
U.S. Cl. 51—309 **10 Claims**

1. A bonded abrasive in the form of a wheel comprising sol-gel alumina abrasive grain, fused alumina abrasive grain, and a binder material.

4,883,502

ABRASIVE COMPOSITION AND PROCESS FOR POLISHING

Kunihiro Miyazaki, and Ken Ishitobi, both of Shiojiri, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 255,897
Claims priority, application Japan, Oct. 9, 1987, 62-253591
Int. Cl.[4] B24D *3/02*
U.S. Cl. 51—309 **12 Claims**

1. A process for polishing a workpiece with an abrasive composition comprising polishing a surface of the workpiece with an aluminous abrasive, nickel sulfamate, and water.

4,883,503

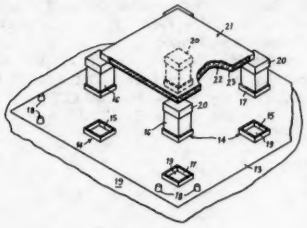
ACCESS FLOOR CONSTRUCTION

Hugh R. A. Fish, London, Great Britain, assignor to Microfloor Systems Limited, London, England

Filed Nov. 2, 1987, Ser. No. 116,099
Int. Cl.[4] E04B *5/48*
U.S. Cl. 52—220 **18 Claims**

1. In an access floor construction in which floor panels are supported above a subfloor on spaced pedestals upstanding from said subfloor, said floor panels being individually removable to provide ready access to underfloor space between said floor panels and said subfloor, the improvement comprising

blocks forming said pedestals, and a base layer of sheeting material disposed on said subfloor and having an array of pedestal block locating means on an upper surface thereof



adapted to retain said pedestal blocks in predetermined positions, said pedestal blocks being disposed in engagement with said block locating means and supporting said floor panels.

4,883,504

GAS CHROMATOGRAPH

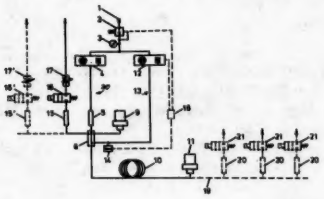
Eberhard Gerstel, Heerstr. 4, D-4330 Mülheim a.d. Ruhr 14, Fed. Rep. of Germany

Filed May 20, 1988, Ser. No. 196,362

Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717456

Int. Cl.[4] B01D *15/08*

U.S. Cl. 55—67 **83 Claims**



1. A process for separation by gas chromatography, comprising the steps of:

in a first operating state

(a) passing a regulated carrier gas stream through a sample applicator,

(b) directing a relatively small portion of flow from said sample applicator to a monitoring detector,

(c) directing the remainder of flow from the sample applicator to an open discharge line,

(d) blocking access to a separation column of flow from the sample applicator with a regulated auxiliary gas stream, and

(e) directing at least the major portion of the regulated auxiliary gas stream to the separation column; and

in a second operating state

(a) closing the discharge line,

(b) directing a relatively small portion of flow from said sample applicator to a monitoring detector,

(c) directing the remainder of flow from the sample applicator, and all the regulated auxiliary gas stream, to said separation column, and

(d) maintaining flow through the sample applicator and the separation column at substantially the same level as during the first operating state.

19. A gas chromatographic system comprising:

a carrier gas supply means for a pressure regulated supply of a carrier gas stream to the system;

a sample application means for the introduction of a sample to be chromatographically handled into the system, said sample application means being able to provide a preliminary chromatographic separation of said sample and being connected with said carrier gas supply means so that a first stream of carrier gas can flow through said sample application means;

a branching means which is provided with two inlet means and at least two outlet means, a first one of said inlet means being connected with said sample application means, a first one of said outlet means being connected with a separation column means and said first inlet and outlet means being connected with each other via a conduit means provided with a throttle means, the second inlet means being connected with said carrier gas supply means for the supply of a regulated second auxiliary carrier gas stream to said conduit means at a location between said first outlet means and said throttle means, and the second outlet means being connected with a switchable valve arrangement and further with said conduit means at a location between said first inlet means and said throttle means; and

two operating states, in the first one of which said valve arrangement is open so that said second auxiliary stream of carrier gas prevents the introduction of incoming components of said sample into said separation column, whereas in the second one of which said valve arrangement is closed so that said incoming components of said sample are introduced into said separation column.

4,883,505

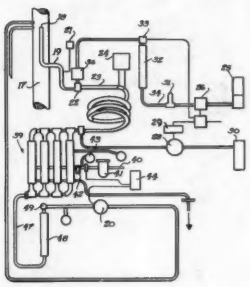
METHODS AND APPARATUS FOR ATMOSPHERIC SAMPLING AND ANALYSIS OF TRACE CONTAMINANTS

Daniel P. Lucero, Triangle, Va., assignor to IIT Research Institute, Chicago, Ill.

Filed Jul. 22, 1988, Ser. No. 223,283

Int. Cl.[4] B01D *53/30*

U.S. Cl. 55—84 **13 Claims**



3. A method for removing and concentrating substances from a flowing gas sample stream and depositing such substances in a liquid film stream in a controlled and quantitative fashion, the method comprising the steps of:

sampling a flowing gas stream by means of a gas probe inserted in the gas stream and transporting the flowing sample gas stream so obtained through a heated transport line to a gas inlet port in an inlet cap of a heated hollow fluorocarbon sample processing tube having a length of at least 100 inches, and a diameter in the range of 0.35 to 0.625 inches having a hydrophylic inner surface;

dispersing a surfactant containing liquid uniformly and circumferentially on the inner surface of the hollow tube by means of liquid dispersion ports circumferentially placed in the top or inlet cap of the sample processing tube, the surfactant containing liquid having been delivered from a

liquid reservoir by means of a liquid transport line, a liquid pump and a liquid metering valve;

removing the substance to be analyzed from the flowing sample gas stream by means of contact of the flowing sample gas stream with the liquid film stream whereby the molecules or substances to be analyzed are removed from the flowing sample gas stream and concentrated in the liquid film stream at the gas-liquid interface to a value such that the concentration of the substance in the liquid film stream is at least 50,000 times the concentration of the substance in the flowing gas stream;

collecting the liquid containing the concentrated substance in a liquid collection well located circumferentially in an outlet cap of the sample processing tube, the liquid collecting well having a liquid port whereby the liquid can be removed from the wall, and venting the flowing sample gas stream from the sample processing tube.

4,883,506

ELECTROSTATIC POWDER COATING INSTALLATION AND METHOD OF OPERATING THE SAME

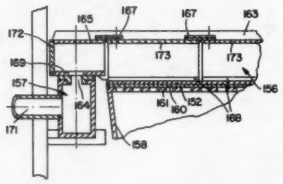
Peter Ribnitz, Hasselstrasse 15, 9013 St. Gallen, Switzerland

Continuation of Ser. No. 913,254, Sep. 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 648,744, Sep. 10, 1984, Pat. No. 4,647,298. This application Apr. 28, 1988, Ser. No. 188,072

Claims priority, application Switzerland, Sep. 8, 1983, 4904/83; Nov. 29, 1983, 6366/83

Int. Cl.[4] B01D *46/04*

U.S. Cl. 55—96 **15 Claims**



1. An electrostatic powder coating installation comprising a cabinet means, means disposed in said cabinet means for discharging electrostatically charged powder, open ended filter strip means located in a bottom area of an inner space of the cabinet means and maintained in a stationary position during a powder coating operation, respective rollers supporting each end of the filter strip means, a first exhaust fan means for producing a suction field with vacuum in the cabinet means through the filter strip means, cleaning means located in said cabinet means and associated with the filter strip means for removing surplus powder lying on the filter strip means, and means for driving said rollers for displacing the filter strip means for at least one length of the cabinet means only upon a pigment change in the powder so as to enable an assigning of a portion of the filter strip means to respective pigments in the powder, wherein said cleaning means comprises a suction nozzle means and means for moving the suction nozzle means in a direction of the filter strip means extending between said rollers.

4,883,507

FILTER COMPRISING A MATERIAL OBTAINED BY FREEZE-DRYING, METHOD OF PREPARATION AND USE ESPECIALLY IN PHARMACY

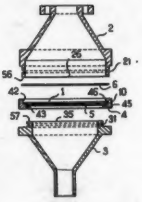
Louis Rey, Epalinges, Switzerland; Brynjulf Ottar, Kjeller, Norway, and Louis Lafon, Paris, France, assignors to Laboratoire L. Lafon, Paris, France

Filed Jun. 29, 1988, Ser. No. 213,308

Claims priority, application France, Jul. 8, 1987, 87 09696; Aug. 12, 1987, 87 11468; Sep. 4, 1987, 87 12277

Int. Cl.[4] B01D *46/10*

U.S. Cl. 55—97 **24 Claims**



1. A method of using a filter element to purify a gaseous fluid, which comprises the steps of (a) passing the gaseous fluid through the filter element with a pressure loss of between about 80 and 10,000 Pa, where in the filter element comprises a porous material produced by freeze-drying a liquid or paste to form a porous product and compressing the product in the form of a porous layer.

4,883,508

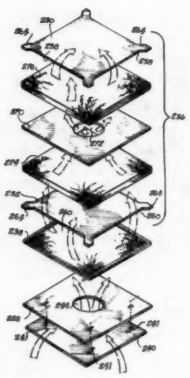
SEMIAUTOMATIC FRYING MACHINE AND AIR FILTER APPARATUS THEREFOR

James P. Lansing, St. Cloud, Minn., assignor to JVJ Enterprises, Inc., St. Cloud, Minn.

Division of Ser. No. 119,785, Nov. 10, 1987. This application Aug. 26, 1988, Ser. No. 237,512

Int. Cl.[4] B01D *50/00*

U.S. Cl. 55—322 **5 Claims**



1. Air filter apparatus for use in filtering an air flow, comprising:

spaced-apart upstream and downstream endwalls each having an inner portion, an outer periphery and an outer portion adjacent the outer periphery, said endwalls further having major surfaces opposing each other and each

endwall being impervious except for defining an air flow opening for allowing said air flow therethrough;

at least two layers of filter media between said endwalls, each having a pair of opposed major surfaces one of which opposes an endwall major surface and the other of which opposes the other media layer, each media layer having an inner portion and an outer portion adjacent the periphery thereof, and each media layer defining an air flow path therethrough between the major surfaces thereof which extends between the inner and outer portions thereof;

an inner wall located between and spaced from the endwalls so as to be positioned between said filter media layers, said inner wall having spaced inner and outer portions, and defining being impervious except for an air flow opening;

sidewall means adjacent the periphery of said filter media layers and cooperating with said endwalls and said inner wall to confine the air flow between the major surfaces of the filter media layers; and

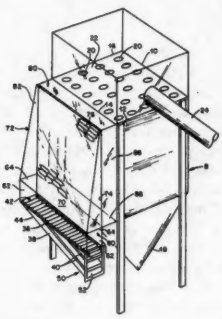
the air flow openings of said endwalls located at one of said inner and said outer portions of said endwalls and the air flow opening of said inner wall located at the other of said inner and said outer portions of said inner wall, with the filter media layers extending between the openings of said endwalls and the inner wall, and the inner wall including means for remaining spaced apart from the end walls so that said air flow passing between said endwalls travels through said media layers between the major surfaces thereof, from the inner to the outer portions thereof, while traversing a generally labyrinthian path through said air filter apparatus.

4,883,509

MULTI STAGE GAS INLET CONSTRUCTION FOR DUST COLLECTORS

Giambattista Giusti, 50 The Fellsway, and Robert W. Duyckinck, 187 Commonwealth Ave., both of New Providence, N.J. 07974

Filed Feb. 12, 1988, Ser. No. 155,567
Int. Cl.[4] B01D *46/02*
U.S. Cl. 55—326 **25 Claims**



1. Apparatus for treating gas being conveyed in a moving high velocity gas stream of first predetermined cross-sectional area,

gas treating means perimetrically defining a gas treatment zone of predetermined height, width and depth,

a gas impervious housing perimetrically surrounding said gas treatment zone,

gas inlet means for equably distributing and introducing said gas stream at reduced velocity into said gas treatment zone, said gas inlet means comprising,

a first velocity reducing transition section having an entry port of substantially said first predetermined crossectional area for reception of said high velocity gas stream, an exit port of second and larger predetermined cross-sectional area to deliver said gas stream therefrom at a first reduced velocity, and first expanded metal grid means of overall planar character selectively disposed in and traversing said exit port for equably distributing and effecting a change in the direction of flow of said gas stream of at least 90°,

means defining a first turbulent flow reduction zone located immediately downstream of said first expanded metal grid means to permit dissipation of localized turbulence induced by passage of said gas stream through said first expanded metal grid means,

a second velocity reducing transition section having an entry port of substantially said second predetermined crosssectional area to receive said reduced velocity gas stream emanating from said first turbulent flow reduction zone, an exit port of a third and still larger cross-sectional perimetrically contoured to conform to the shape, height and width of at least a substantial portion of said gas treatment zone and disposed in spaced fluid communicating relation thereto through a complementally contoured opening in said gas impervious housing to deliver said gas stream at a second and further reduced velocity, and second expanded metal grid means of overall planar character selectively disposed in and traversing said exit port for equably distributing and effecting a change in the direction of flow of said gas stream of at least 90°, and

means defining a second turbulent flow reduction zone immediately downstream of said second expanded metal grid means and intermediate said second grid means and said gas treatment zone to permit dissipation of localized turbulence induced by passage of said gas stream through said second expanded metal grid means,

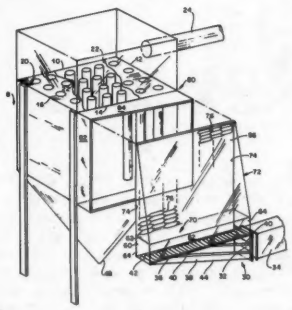
said first and second expanded metal grid means each having a plurality of polygonal openings therein each bounded by a three dimensional border of angularly offset strands, at least one strand of which is of a double width disposed in generally facing relation to the approaching gas stream.

4,883,510

GAS INLET CONSTRUCTION FOR FABRIC FILTER DUST COLLECTIONS

Giambattista Giusti, 50 The Fellsway, and Robert W. Duyckinck, 187 Commonwealth Ave., both of New Providence, N.J. 07974

Filed Feb. 12, 1988, Ser. No. 155,446
Int. Cl.[4] B01D *46/02*
U.S. Cl. 55—326 **12 Claims**



1. In fabric filter dust collector apparatus for separating and collecting entrained particulate matter being conveyed in an incoming gas stream of a first predetermined cross-sectional area,

a multiplicity of vertically oriented elongate filter bags arranged in spaced parallel relation to each other and peri-

metrically defining a particle separation zone of predetermined height, width, and depth,

a gas impervious housing surrounding said particle separation zone including side walls and a dependent particle collecting hopper,

gas inlet means for equably distributing and introducing the incoming gas stream and entrained particulate matter at reduced velocity into said particle separation zone, said gas inlet means comprising,

a velocity reducing transition section having an entry port of second predetermined cross-sectional area for reception of the incoming gas stream, an exit port of a third and markedly enlarged cross-sectional area disposed in spaced fluid communicating relation with said particle separation zone through a complementally contoured opening in said gas impervious housing to deliver the gas stream therefrom at reduced velocity and expanded metal grid means of overall planar character disposed in and traversing said exit port for equably distributing and diverting the incoming gas stream through at least a 90° change of direction for delivery toward said filter bags,

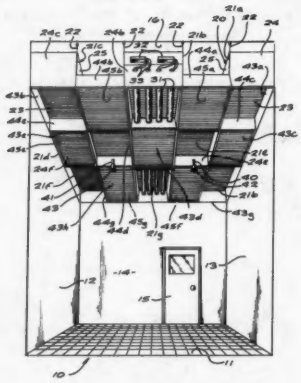
said expanded metal grid means having a plurality of polygonal openings therein each bounded by a three dimensional border of angularly offset strands, at least one strand of which is of a double width disposed in facing relation to the approaching gas stream.

4,883,511

LAMINAR FLOW MULTIPLANE MATRIX CEILING SYSTEM

Arnold Gustin, and Kevin McGillivray, both of 28210 Crocker Ave., Suite 301, Valencia, Calif. 91355

Filed Mar. 25, 1988, Ser. No. 173,316
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—355 **12 Claims**



1. A multiplane modular ceiling system for clean rooms comprising a first set of first framed filters, each including a generally planar filter medium and a peripheral frame enclosing and mounting a respective filter medium in a horizontal plane for air flow from the upper side of the filter medium to the lower side of the filter medium, with the upper side of the filter medium exposed to an air supply plenum above said framed filters and the lower side of the framed filters exposed to a space to be maintained as a clean room;

said first framed filters being of regular shape and each peripheral frame including depending substantially air tight walls extending below the lower surface of said filter medium;

a second set of framed filters, each including a generally planar filter medium and a peripheral frame enclosing and mounting a second respective filter medium with an upper surface of said filter medium exposed to the air supply in said plenum and the lower surface of said filter medium exposed to the space to be maintained as a clean room;

said second set of framed filters defining an edge trough open at the top with lengths corresponding to the lengths of the lower edge of the first frame depending substantially air tight walls;

seal means within said troughs;

the first set of framed filters having the lower edges thereof resting in respective troughs in sealed relationship with said second set of troughs;

means securing said first set of framed filters to said second set of framed filters in supporting relationship therewith; and

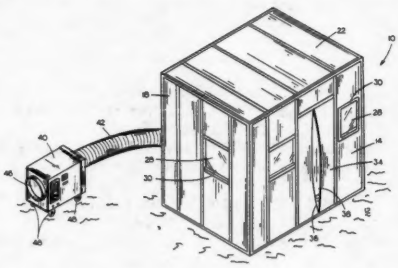
means for supporting said framed filters from the plenum side of said framed filters.

4,883,512

PORTABLE ISOLATION ENCLOSURE

Steven C. Griffis, 2929 Ave. D, Council Bluffs, Iowa 51501

Filed Feb. 21, 1989, Ser. No. 313,160
Int. Cl.[4] B01D *46/06*
U.S. Cl. 55—356 **2 Claims**



1. A portable enclosure for collecting contaminated material from the ground, comprising:

an open-bottomed enclosure means having a top portion, a wall means depending from said top portion and extending to the ground, and an interior adapted to accommodate at least one person for collecting contaminated material from the ground within the enclosure means;

said top portion and wall means being sealed to prevent contaminated material from passing therethrough; said wall having at least one selectively closable door means provided therein to permit a person to enter and exit said interior of said enclosure means;

said enclosure means being constructed of lightweight materials such that a person can lift and transport said enclosure along the ground;

air vacuuming means pneumatically connected to said interior through said wall means, to remove air from said enclosure means and to place a negative air pressure in said interior;

said air vacuuming means further including air filtration means for removing contaminated materials from the air;

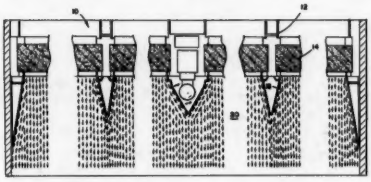
wheel means mounted on said air vacuuming means such that said air vacuuming means will move in conjunction with the movement of said enclosure means; and

said door means being operable to allow wire to enter said enclosure when a negative air pressure is present in said interior, and operable to prevent escape of contaminated material therethrough when a negative air pressure is not present in said interior.

4,883,513
FILTER CAP FOR CLEAN ROOM CEILING GRID SYSTEM

Donald R. Monson, West St. Paul, and James A. Leblanc, Eden Prairie, both of Minn., assignors to Donaldson Company, Inc., Post Office Box 1299, Minn.

Filed Feb. 5, 1988, Ser. No. 152,942
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—385.2 11 Claims

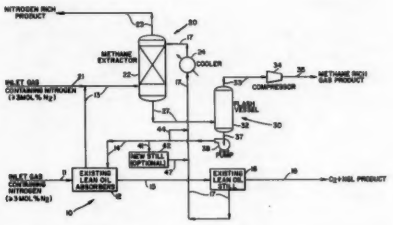


1. A system for providing an airtight/particle tight hermetically sealed clean room environment consisting of a clean room bounded by a ceiling, a floor, and sidewalls extending therebetween; said clean room including a ceiling grid filter system comprising a plurality of ceiling mounted grid members arranged in a pattern beneath said clean room ceiling; said ceiling grid members defining a plurality of apertures receiving filter panels therein, said filter panels being mounted on peripheral portions of said grid members defining said apertures, and said filter panels each having an upper end constructed and arranged for receiving supply air, a lower end constructed and arranged for emitting filtered air into said clean room, and filter panel sidewalls; said filter panel sidewalls defining sides of a chamber located between adjacent filter panels, and between filter panels and adjacent clean room sidewalls; and, said ceiling grid filter system comprising filter caps each having upper ends and a lower end, said filter caps each having sidewalls extending between said filter cap upper ends and said filter cap lower end, said filter cap sidewalls comprising angled attaching means at said filter cap upper ends for removably attaching said filter caps to angled means on said filter panel sidewalls, said filter caps extending downwardly into said clean room and each comprising means for hermetically sealing said filter panel sidewalls and for providing substantially laminar flow of clean room air beneath said filter cap lower end.

4,883,514
PROCESSING NITROGEN-RICH GASES WITH PHYSICAL SOLVENTS

Yuv R. Mehra, The Woodlands, Tex., assignor to Advanced Extraction Technologies, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 24,561, Mar. 11, 1987, Pat. No. 4,740,222, which is a continuation-in-part of Ser. No. 854,383, Apr. 21, 1986, Pat. No. 4,743,282, which is a continuation-in-part of Ser. No. 828,996, Feb. 13, 1986, Pat. No. 4,696,688, and Ser. No. 828,988, Feb. 13, 1986, Pat. No. 4,680,042, each is a continuation-in-part of Ser. No. 808,463, Dec. 13, 1985, Pat. No. 4,642,174, which is a continuation-in-part of Ser. No. 784,566, Oct. 4, 1985, Pat. No. 4,817,038, which is a continuation-in-part of Ser. No. 759,327, Jul. 26, 1985, Pat. No. 4,623,371, which is a continuation-in-part of Ser. No. 758,351, Jul. 24, 1985, Pat. No. 4,601,738, which is a continuation-in-part of Ser. No. 637,210, Aug. 3, 1984, Pat. No. 4,578,094, which is a continuation-in-part of Ser. No. 532,005, Sep. 14, 1983, Pat. No. 4,526,594, which is a continuation-in-part of Ser. No. 507,564, Jun. 24, 1983, Pat. No. 4,511,381, which is a continuation-in-part of Ser. No. 374,270, May 3, 1982, Pat. No. 4,421,535. This application Jul. 16, 1987, Ser. No. 74,226
The portion of the term of this patent subsequent to Nov. 18, 2003, has been disclaimed.
Int. Cl.[4] F25J *3/00*
U.S. Cl. 62—17 5 Claims



1. A process for separating C_1+ hydrocarbons and nitrogen from a nitrogen-rich gas stream which contains more than 3 mol % of said nitrogen, comprising the following steps:

A. contacting said nitrogen-rich gas stream with a lean oil, comprised of paraffinic, aromatic or cyclo hydrocarbons or mixtures thereof having molecular weights ranging between 75 and 250, at temperatures no lower than −40° F. to produce a nitrogen stream as an overhead product and a bottoms methane-rich oil stream; and

B. flashing said bottoms methane-rich oil stream to recover a methane-rich overhead gas product and a lean oil rich bottoms stream; and recycling said lean oil stream to said contacting of step A.

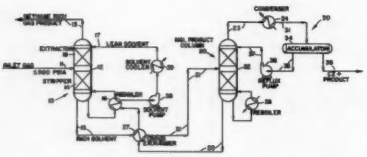
4,883,515
PROCESSING HYDROCARBON GASES WITH SELECTED PHYSICAL SOLVENTS

Yuv R. Mehra, The Woodlands, and Freylon B. Coffey, Austin, both of Tex., assignors to Advanced Extraction Technologies, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 100,242, Sep. 23, 1987, Pat. No. 4,832,718, which is a continuation-in-part of Ser. No. 74,226, Jul. 16, 1987, which is a continuation-in-part of Ser. No. 24,561, Mar. 11, 1987, Pat. No. 4,740,222, which is a continuation-in-part of Ser. No. 854,383, Apr. 21, 1986, Pat. No. 4,743,282, which is a continuation-in-part of Ser. No. 828,996, Feb. 13, 1986, Pat. No. 4,696,688, which is a continuation-in-part of Ser. No. 828,988, Feb. 13, 1986, Pat. No. 4,680,042, which is a continuation-in-part of Ser. No. 808,463, Dec. 13, 1985, Pat. No. 4,692,179, which is a continuation-in-part of Ser. No. 784,566, Oct. 4, 1985, Pat. No. 4,817,038, which is a continuation-in-part of Ser. No. 759,327, Jul. 26, 1985, Pat. No. 4,623,371, which is a continuation-in-part of Ser. No. 758,351, Jul. 24, 1985, Pat. No. 4,601,738, which is a continuation-in-part of Ser. No. 637,210, Aug. 3, 1984, Pat. No. 4,578,094, which is a continuation-in-part of Ser. No. 532,005, Sep. 14, 1983, Pat. No. 4,526,594, which is a continuation-in-part of Ser. No. 507,564, Jun. 24, 1983, Pat. No. 4,511,381, which is a continuation-in-part of Ser. No. 374,270, May 3, 1982, Pat. No. 4,421,535. This application Sep. 29, 1987, Ser. No. 102,350

Int. Cl.[4] F25J *3/00*

U.S. Cl. 62—17 5 Claims



1. In a process for separating a C_2+hydrocarbons product and a methane gas product from a natural gas stream with a physical solvent, comprising the following steps:

A. contacting said hydrocarbon gas stream with said physical solvent to produce an overhead gas stream of said methane and a rich solvent bottoms stream,

B. regenerating said solvent bottoms stream to produce an overhead stream of said C_2+hydrocarbons product and a regenerated solvent bottoms stream, and

C. recycling said regenerated solvent stream to said Step A, the improvement comprising said contacting of said Step A, at a pressure no more than approximately 500 psia and at a pressure under which the difference between liquid and vapor density is at least 20 lbs/cubic foot, with said physical solvent selected from the group consisting of

1. paraffinic solvents having molecular weights ranging from 75 to 140 and UOP characterization factors ranging from 12.0 to 13.5, said factors being independent of the aromatic content of said paraffinic solvents;

2. naphthenic solvents having molecular weights ranging from 75 to 130 and UOP characterization factors ranging from 10.5 to 12.0, said factors being independent of the aromatic content of said naphthenic solvents; and

3. benzene and toluene.

4,883,516
AIR SEPARATION

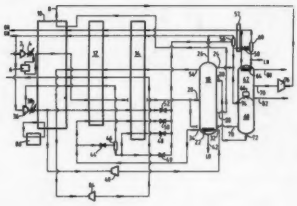
David J. Layland, Norton, and John T. Lavin, Chingford, both of England, assignors to The BOC Group, Inc., Murray Hill, N.J.

Filed Apr. 4, 1988, Ser. No. 176,900

Claims priority, application United Kingdom, Apr. 7, 1987, 8708266; Mar. 18, 1988, 8806477

Int. Cl.[4] F25J *3/04*

U.S. Cl. 62—22 11 Claims



1. A process of separating air comprising removing carbon dioxide and water vapor from compressed air, reducing the temperature of the compressed air in a heat exchange means to a temperature suitable for its separation by cryogenic distillation, separating the air into nitrogen and oxygen using one or a plurality of distillation columns, taking a stream enriched in argon from one distillation column and introducing it into a further distillation column in which an argon product is produced, introducing vapor from said one column or another of said plurality of columns into said further distillation column to provide reboil therefor; and returning the resulting condensed vapor as reflux to the distillation column from which it was withdrawn.

4,883,517
AIR SEPARATION

Thomas Rathbone, Farnham, United Kingdom, assignor to The BOC Group, Inc., New Providence, N.J.

Filed Jan. 13, 1989, Ser. No. 297,145

Claims priority, application United Kingdom, Jan. 14, 1988, 8800842

Int. Cl.[4] F25J *3/04*

U.S. Cl. 62—22 16 Claims

1. A process of separating air, comprising the steps of:

(a) introducing a stream of air into a first distillation column;

(b) withdrawing an oxygen-rich liquid from a bottom region of the first distillation column and introducing it into a top region of a mixing zone;

(c) withdrawing nitrogen-rich vapor from the first distillation column and introducing it into a bottom region of the mixing zone;

(d) establishing through the mixing zone a downward flow of liquid that becomes progressively richer in nitrogen and an upward flow of vapor that becomes progressively richer in oxygen;

(e) withdrawing liquid nitrogen from the mixing zone and introducing it into the top of the first distillation column to act as reflux;

(f) withdrawing as product or waste a mixed stream comprising oxygen and nitrogen from a chosen level of the mixing zone;

(g) providing condensation for oxygen-rich vapor at the top of the mixing zone;

(h) withdrawing from the first distillation column a stream enriched in argon relative to the air stream, and separating an argon product from the argon-containing stream in a second distillation column; and

(i) withdrawing a vapor stream from a level of the mixing zone intermediate the level from which said mixed stream

is withdrawn and the top thereof, condensing said vapor stream in heat exchange with a stream of boiling liquid from one of the distillation columns, returning a stream of thus-formed condensate to the mixing zone, and returning the boiled liquid to said distillation column.

4,883,518

PROCESS FOR AIR FRACTIONATION BY LOW-TEMPERATURE RECTIFICATION

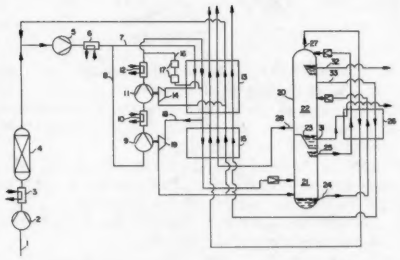
Werner Skolaude, Munich; Gunnar Eggendorfer, Gruenwald, and Horst Corduan, Puchheim, all of Fed. Rep. of Germany, assignors to Linde Akitengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,606

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738559

Int. Cl.[4] F25J *3/00*

U.S. Cl. 62—38 **36 Claims**



1. In a process for air fractionation by low-temperature rectification comprising a rectification step from which nitrogen and product oxygen streams are obtained and a cooling stage wherein a process gas of the air fractionation is employed as working gas to produce refrigeration by compression and expansion of at least a portion of said working gas, the improvement comprising:

compressing said working gas in said cooling stage and thereafter dividing said working gas into a first partial stream and a second partial stream, both of which are at least partially cooled and at least partially subjected to engine expansion, said first partial stream being expanded at a temperature higher than that at which the second partial stream is expanded;

compressing at least said second partial stream, prior to expansion, wherein work gained during expansion of at least a part of one of said partial streams is utilized in the compression of said second partial stream, said compression of said second partial stream being performed in two compression stages; and

introducing at least a portion of at least one of said partial streams to the rectification step.

4,883,519

PROCESS FOR THE PRODUCTION OF HIGH PRESSURE NITROGEN WITH SPLIT REBOIL-CONDENSING DUTY

Rakesh Agrawa, Allentown; Steven R. Auvil, Macungie, and Keith B. Wilson, Allentown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 6, 1988, Ser. No. 254,512

Int. Cl.[4] F25J *3/00*

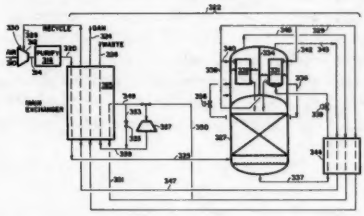
U.S. Cl. 62—39 **17 Claims**

1. A process for the recovery of nitrogen from a feed gas stream containing nitrogen and oxygen whereby a pressurized condition is retained in a recycle process stream comprising the steps of:

(a) compressing a feed gas stream containing nitrogen and oxygen to an elevated pressure;

(b) introducing the elevated pressure feed gas stream into a cryogenic separation zone to recover a high purity nitrogen product from said zone and to produce an initial oxygen-enriched waste stream;

(c) introducing the initial oxygen-enriched waste stream into a first reboil-condenser zone of the cryogenic separation



zone to recover an elevated pressure recycle stream and a second reboil-condenser zone to recover a final oxygen-enriched waste stream; and

(d) removing said elevated pressure recycle stream from said cryogenic separation zone and while at least maintaining the oxygen content of said recycle stream, recycling said stream at elevated pressure to the feed gas stream for introduction into the cryogenic separation zone.

4,883,520

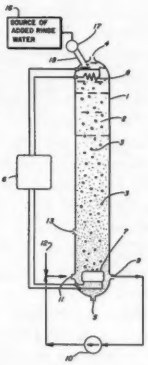
WATER TREATMENT APPARATUS AND METHOD

Colin A. Connery, Mt. Vernon, N.Y., assignor to Living Water Corporation, Chicago, Ill.

Continuation of Ser. No. 943,423, Dec. 19, 1986, abandoned. This application Aug. 29, 1988, Ser. No. 238,526

Int. Cl.[4] C02F *1/22*

U.S. Cl. 62—542 **25 Claims**



1. An apparatus for producing an effectively stratified vertical column of salt water containing at least one foreign substance dissolved therein, from the top of which column water of a certain degree of purity can be obtained, and from the bottom of which column a concentrate of a certain concentration can be obtained, which apparatus comprises:

(a) a vertically oriented, heat insulated, watertight duct;

(b) a column of chilled water confined in said duct, said water containing said at least one foreign substance dis-

solved therein, said column of water having a bottom and a top;

(c) means for introducing small, individual pieces of ice into said column of salt water adjacent the bottom thereof at such a rate and in such a manner that said individual pieces of ice float freely and separately from the bottom portion to the top portion of said column of water, without being packed together, while water containing said at least one foreign substance that clings to said small, individual pieces of ice is carried up through said column of water and is rinsed off said pieces of ice by water at successively higher levels in said column;

(d) means for removing said small, individual pieces of ice from the top of said column of salt water after they have floated freely and separately, as aforesaid, up to the top of the column;

(e) means for introducing added rinse water into the top of said column of salt water,

the volume of added rinse water thus introduced being the quantity necessary to maintain the concentration of said at least one foreign substance in said column of salt water at the top thereof at a level no higher than a first predetermined maximum concentration when the desired end product from the use of said effectively stratified column of water is water of said certain degree of purity;

(f) means for removing heavy brine from the bottom of said column of salt water,

the volume of heavy brine thus removed being the quantity necessary to maintain the concentration of said at least one foreign substance in said column of salt water at the bottom thereof at a level no higher than a second predetermined maximum concentration when the desired end product from the use of said effectively stratified column of water is concentrate of said certain concentration, said second predetermined maximum concentration being substantially higher than said first predetermined maximum concentration; and

(g) means for introducing a quantity of added salt water into said column of salt water,

the volume of said quantity of added salt water, plus the volume of any small, individual pieces of ice introduced from outside the duct into said column of chilled water, plus the volume of any additional rinse water introduced from outside the duct into the column of chilled water being substantially equal to the volume of said pieces of ice removed as described above, plus the volume of any heavy brine removed as described above,

said means for introducing pieces of ice, said means for removing pieces of ice, said means for introducing added rinse water, said means for removing heavy brine, and said last mentioned means for introducing added salt water all being adapted to minimize the impartation of stirring or mixing motion to said column of salt water,

whereby, after said introduction and removal of said pieces of ice, said introduction of added rinse water, said removal of heavy brine, and said introduction of a quantity of added salt water have been carried out for a period of time, the concentration of said at least one foreign substance dissolved in said column of salt water varies substantially continuously from the greatest concentration at the bottom of said column to the lowest concentration at the top thereof, with the concentration at any given level in said column of salt water being substantially the same throughout said given level.

4,883,521

METHOD FOR THE PREPARATION OF SILICA GLASS

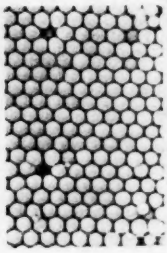
Takaaki Shimizu, and Syuji Tanaka, both of Niigata, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Sep. 26, 1988, Ser. No. 249,317

Claims priority, application Japan, Sep. 30, 1987, 62-24685; Sep. 30, 1987, 62-246686

Int. Cl.[4] C03B *37/016*

U.S. Cl. 65—17 **11 Claims**



1. A method for the preparation of transparent silica glass which comprises the successive steps of:

(a) hydrolyzing an alkoxy silane compound in the presence of a basic catalyst to prepare a dispersion containing spherical particles of silica;

(b) removing the basic catalyst from the dispersion by distillation so as to bring the pH of the dispersion to 8 or below;

(c) settling the silica particles in the dispersion;

(d) discarding the supernatant from the dispersion to obtain a first deposit of the silica particles;

(e) dispersing the first deposit of silica particles in a silica sol solution of a hydrolyzate of an alkoxy silane compound obtained by the hydrolysis thereof in the presence of an acidic catalyst to prepare a dispersion of the silica particles in the silica sol solution;

(f) adjusting the pH of the dispersion to have a value of 2 to 6;

(g) settling the silica particles in the dispersion;

(h) discarding the supernatant from the dispersion to obtain a sexcond deposit of the silica particles;

(i) heating the second deposit of the silica particles to obtain a wet gel thereof; and

(j) drying, sintering and vitrifying the wet gel of silica particles to give a block of transparent silica glass.

4,883,522

FABRICATION OF MACRO-GRADIENT OPTICAL DENSITY TRANSMISSIVE LIGHT CONCENTRATORS, LENSES AND COMPOUND LENSES OF LARGE GEOMETRY

James J. Hagerty, Saratoga, and Leslie A. Danziger, Los Altos Hills, both of Calif., assignors to Integrated Solar Technologies Corp., San Jose, Calif.

Continuation-in-part of Ser. No. 87,598, Aug. 19, 1987, abandoned. This application Jun. 17, 1988, Ser. No. 206,109

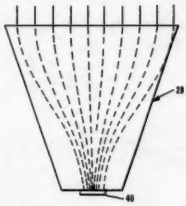
Int. Cl.[4] C03B *19/06*

U.S. Cl. 65—18.4 **7 Claims**

1. A process for preparing a refractive glass article having an intermediate index of refraction from those of the constituent components thereof comprising the steps of: selecting two glass samples having selected indices of refraction and similar coefficients of expansion in vitrified form, powdering the samples to a chose grit, mixing the two powders formed thereby by weight in a proportion which reflects the desired final index of refraction of said refractive article as being substantially a combination of the indices of refraction of the selected glasses according to the proper weight proportion thereof, mechanically compacting the sample, heating the mixture of powdered glass samples prepared thereby to a temperature above the higher of the softening temperatures of the powdered glass

samples employed for a chosen period of time, and cooling the fused glasses at a rate such that significant annealing occurs.

4. A process for preparing an article having a bidirectionally graded index of refraction comprising the steps of: preparing a series of powdered glass samples having decreasing indices of refraction and similar coefficients of expansion in vitrified form, placing the powdered glass sample having the highest index of refraction in the bottom region of a crucible having a chosen shape and having further a generally cylindrical cross section to a chosen height, mechanically compacting the sample, forming an annular region between the wall of the crucible and the central volume thereof beginning above the layer of powdered glass sample having the highest index of refraction by using a cylindrical tube having a thin wall and a chosen outside diameter, forming successive layers of the powdered



glass samples each having a chosen height in the annular region formed and mechanically compacting each layer before the next layer is placed above it, each layer being composed of a glass powder having an index of refraction lower than that of the layer immediately below it, the powdered glass sample having the lowest index of refraction occupying the uppermost layer of the annular region, removing the cylindrical tube, filling the central volume with the powdered glass sample having the highest index of refraction and mechanically compacting it, heating the assembly of powdered glass samples prepared thereby to a temperature above the highest softening temperature of the powdered glass samples employed for a chosen period of time, cooling the fused glasses at a rate such that significant annealing occurs, and removing the fused glasses from the crucible.

4,883,523

AVOIDANCE OF SURFACE DETERIORATION OF GLASS DURING STRENGTHENING PROCESSES

Husi-Chuan Lee, Albany; Hisayoshi Toratani, Fremont, and Helmuth E. Meissner, Pleasanton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed May 17, 1988, Ser. No. 194,786
Int. Cl.[4] C03B *27/02*
U.S. Cl. 65—30.14 **28 Claims**

1. In a process for strengthening a glass part comprising immersing said glass part in a salt melt containing an alkali metal salt to effect ion exchange therewith, the improvement comprising purging said salt melt with a chlorine-containing gas to convert substantially all water and all hydroxyl ions dissolved therein to hydrogen chloride gas.

4,883,524

INVISIBLE FLAT-TOP MOLD BLANK AND METHOD FOR MANUFACTURING SAME

Alexander C. Bristol, 14317 SW. 142 Ave., Miami, Fla. 33186

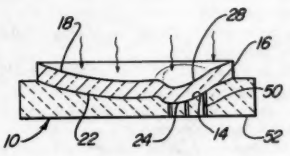
Filed Jul. 25, 1988, Ser. No. 223,645
Int. Cl.[4] C03B *23/00*
U.S. Cl. 65—37 **5 Claims**

1. A method for manufacturing a mold blank for an optical lens having a bifocal segment comprising the steps of:

constructing a mold having a concave surface and a recess corresponding in shape to the bifocal segment,

forming a concave surface and a convex surface spaced apart on a thermally deformable mold blank,

placing said convex surface of a thermally deformable mold blank on said concave surface and across said recess of said mold,



heating said mold and said mold blank to a preselected temperature at which said mold blank thermally deforms and a portion of said unitary mold blank is sagged against said recess whereby said bifocal segment is formed in said mold blank, and

cooling said mold blank.

4,883,525

GLASS-CERAMIC SUPPORT FOR FUSING AND SAGGING OPHTHMALMIC MULTIFOCAL LENSES

Milford L. Buckley, Horseheads, N.Y., and Harry L. Burke, Harrodsburg, Ky., assignors to Corning Incorporated, Corning, N.Y.

Filed Aug. 5, 1988, Ser. No. 228,455
Int. Cl.[4] C03B *11/08*
U.S. Cl. 65—37 **21 Claims**

8. A method of supporting a multifocal ophthalmic lens assembly during a heat treatment which comprises providing a low expansion glass-ceramic body, surfacing the upper surface of the body to a predetermined curvature, applying a coating of a titania-alumina-mica paint to the upper surface, baking the coating, said coating being capable of withstanding temperature up to 750° C. and thereafter mounting the multifocal assembly on said coated surface for heat treatment.

16. A method of heat treating a multifocal ophthalmic lens assembly which comprises providing a low expansion glass-ceramic body, surfacing the upper surface of the body to a predetermined curvature, applying a coating of a titania-alumina-mica paint to the upper surface, baking the coating said coating being capable of withstanding temperatures up to 750° C., and thereafter mounting the multifocal assembly on said coated surface for heat treatment and subjecting said assembly to an elevated temperature for a predetermined time.

4,883,526

METHOD AND APPARATUS FOR SHAPING AND CONVEYING GLASS SHEETS

Allan T. Enk; Jennifer R. Wolfe, and John W. Borer, all of Toledo, Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Filed Mar. 30, 1989, Ser. No. 331,258
Int. Cl.[4] C03B *23/023*
U.S. Cl. 65—104 **16 Claims**

1. A process for conveying a formed glass sheet, in a glass treatment system of the type including a furnace for heating a glass sheet to the plastic temperature thereof, a press bending glass forming station for bending the glass sheet into a desired

shape, and an unloading zone for discharging the formed glass sheet, the process comprising the steps of:

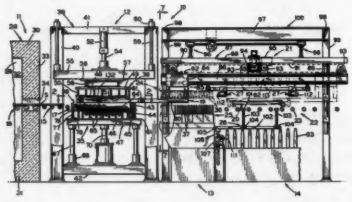
(A) positioning a shuttle ring to receive a formed glass sheet, the shuttle ring conforming in outline and elevation to the marginal edges of the formed glass sheet;

(B) transferring the formed glass sheet from a lower shaping mold onto the shuttle ring, by the relative downward vertical movement of the lower shaping mold away from an upper shaping mold;

(C) conveying the shuttle ring having the formed glass sheet thereon, to a glass discharge zone; and

(D) removing the formed glass sheet from the shuttle ring.

10. Apparatus for conveying a formed glass sheet, in a glass treatment system of the type including a furnace for heating a glass sheet to the plastic temperature thereof, a press bending glass forming station for bending the glass sheet into a desired shape, optionally a tempering station for tempering the formed



glass sheet, and an unloading zone for discharging the glass sheet, the apparatus comprising:

(A) a shuttle ring conforming in outline and elevation to the marginal edges of the formed glass sheet;

(B) a first support means for positioning the shuttle ring concentric with and slightly below a lower shaping rail of a lower shaping mold during a press bending glass forming operation in which the lower shaping mold contacts an upper shaping mold thereby forming the glass sheet;

(C) a second support means for positioning the shuttle ring to engage and support the formed glass sheet upon the relative downward vertical movement of the lower shaping mold away from the upper shaping mold;

(D) means for conveying the shuttle ring and formed glass sheet supported thereon away from the upper and lower shaping molds; and

(E) an unloading means for removing the formed glass sheet from the shuttle ring.

4,883,527

GLASS SHEET BENDING AND TEMPERING APPARATUS

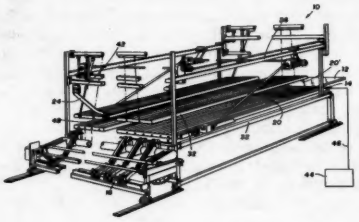
Harold A. McMaster, Woodville; Norman C. Nitschke; Dexter H. McMaster, both of Perrysburg, and Ronald A. McMaster, Woodville, all of Ohio, assignors to Glasstech International L.P., Scarsdale, N.Y.

Continuation of Ser. No. 83,675, Aug. 7, 1987, Pat. No. 4,822,398. This application Sep. 27, 1988, Ser. No. 249,718

Int. Cl.[4] C03B *23/03*

U.S. Cl. 65—273 **16 Claims**

1. A glass bending and tempering apparatus comprising: a first platen for receiving a heated glass sheet to be bent; said first platen being deformable and including an actuator for deforming said platen from a planar shape to a bent shape; said first platen including quench openings throughout the extent thereof; said quench openings of the first platen movable therewith during the deformation of the platen; a second platen having quench openings throughout the extent thereof and opposing the first platen in spaced relationship with the glass sheet therebetween; said actuator being constrainable and having the ability to lift portions of said first platen a controlled distance to form the desired bent shape in the glass sheet; and quenching gas being supplied to the quench openings of both



platens and thereby to both sides of the glass sheet to temper the bent glass sheet between the platens.

4,883,528

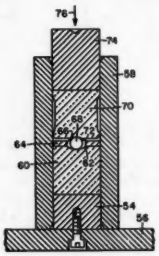
APPARATUS FOR MOLDING GLASS OPTICAL ELEMENTS

Larry L. Carpenter, Painted Post; Mark L. Morrell, Horseheads, and Peter A. Schrauth, Elmira, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Mar. 8, 1989, Ser. No. 320,753

Int. Cl.[4] C03B *11/08*

U.S. Cl. 65—275 **36 Claims**



1. A apparatus for molding a glass optical element having first and second opposed optical surfaces and a predetermined diameter comprising

a molded first mold formed of glass and having a first glass molding surface adapted to form said first optical surface,

a second mold having a second glass molding surface adapted to form said second optical surface,

a ring having a predetermined desired thickness and defining a central longitudinal aperture having a diameter corresponding to said predetermined diameter, and

constraining means for holding said ring intermediate said first and second molds such that said first and second glass molding surfaces are disposed in an opposing cooperative molding relationship,

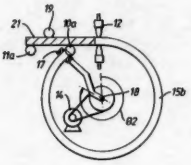
said ring and said first and second glass molding surfaces defining a mold cavity of predetermined volume.

4,883,529

CIRCULAR TUBE SHAPING APPARATUS

Hiroshi Nishimura, and Satoshi Tanaka, both of Kanagawa, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 26, 1988, Ser. No. 236,728
Claims priority, application Japan, Aug. 27, 1987, 62-213535; Jun. 30, 1988, 63-106772
Int. Cl.[4] C03B 23/06
U.S. Cl. 65—281 3 Claims



1. An apparatus for shaping a tube into circle, comprising:
rod means releasably engageable to a rear end of the tube for extending the length of the tube, the rod means comprising a dummy extension of the tube positioned substantially coextensive with the tube;
means for supporting and feeding a combination of the tube and the rod means for movement toward the front end of the tube, the supporting means comprising means for initially supporting only the tube of the combination and finally supporting only the rod means of the combination;
means located ahead of the supporting means in a direction of movement of the combination for locally heat softening the tube;
turning arm means having a free end rotatable about an axis, including means for coupling the turning arm means to the front end of the tube for pulling the tube along a circle around the axis, so that the tube is shaped into a circle defined by turning movement of the turning arm means; and
means coupled to the means for supporting and feeding for moving said combination in synchronism with said turning arm means.

4,883,530

USE OF AMMONIUM SYNGENITE AS A SLOW-ACTING NITROGEN FERTILIZER

Walter Von Maessenhausen, Ludwigshafen; Vilmos Czikkely, Mannheim, and Johann Jung, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 856,970, Apr. 29, 1986, abandoned. This application Mar. 17, 1988, Ser. No. 170,626
Claims priority, application Fed. Rep. of Germany, May 22, 1985, 3518369
Int. Cl.[4] C05C 3/00; C05D 9/00; C05B 3/00
U.S. Cl. 71—36 3 Claims

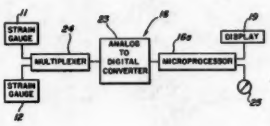
1. A process for fertilizing soils with a sustainedreleased fertilizing composition by applying the composition to soils, said composition consisting of ammonium syngenite or a mixture of finely divided ammonium sulfate and finely divided hydrated or anhydrous calcium sulfate, calcium chloride and/or dicalcium phosphate, with the proviso that the molar ratio of calcium to $S_4^=$ in the mixture is 1:2±10% .

4,883,531

THREAD FRICTION MEASUREMENT ARRANGEMENT

Michael Cole, 6 Beedy Road, Scraptoft, Leicester; Dennis L. Munden, The Paddock, Ford View Close, Great Glen, Leicester, and Marilynn J. Ryan, 32 Dominion Road, Glenfield, Leicester, LE3 8FA, all of England

Filed May 25, 1988, Ser. No. 198,731
Claims priority, application United Kingdom, May 29, 1987, 8712658
Int. Cl.[4] G01N 19/02
U.S. Cl. 73—9 1 Claim



1. A thread friction measuring arrangement comprising first and second strain gauges arranged in a thread path to either side of a cylindrical surface against which friction is to be measured so that the said first and second strain gauges give first and second electrical outputs respectively corresponding to the tension in the thread before and the second tension in the thread after turning around the said surface so as to turn through an angle 0, and further comprising electronic means computing the frictional coefficient of the thread on the surface from the said electrical outputs, said electronic means comprising logarithm evaluating means evaluating logarithms of said first and second outputs, and computing means subtracting the logarithm of said first output from the logarithm of said second output, and output means outputting the result of such subtraction divided by the angle θ.

4,883,532

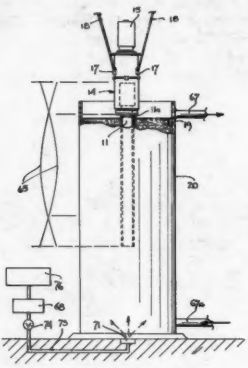
SONIC METHOD FOR FACILITATING THE EXTRACTION OF MINERALS FROM ORE IN A LEACHANT

Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406

Continuation-in-part of Ser. No. 128,454, Dec. 3, 1987, Pat. No. 4,780,138, which is a continuation of Ser. No. 923,575, Oct. 27, 1986, abandoned. This application Jul. 22, 1988, Ser. No. 222,895
The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.
Int. Cl.[4] C22B 3/00, 3/02
U.S. Cl. 75—101 R 4 Claims

1. A method for facilitating the separation of mineral from ore in a leachant comprising the steps of:
attaching an oscillator to one end of a bar member of an elastic material,
supporting said oscillator with said bar member suspended in tension in said leachant and ore without any sidewise support for freedom of lateral motion throughout substantially the entire extent of said bar member; and
driving said oscillator so as to cause cycloidal resonant standing wave vibration of said bar member to effect nutating motion of said bar member throughout the longitudinal extent thereof,
whereby sonic energy is transferred from said bar member to

the leachant and ore to set up force vectors therein both normal and tangential to said bar member thereby facili-



tating the mixing of the ore and leachant and engendering the separation of the mineral from the ore.

4,883,533

MODIFIED SYNTHETIC HYDROTALCITE

John A. Kosin, Bel Air; Barry W. Preston, Whiteford, and David N. Wallace, Elkton, all of Md., assignors to J. M. Huber Corporation, Locust, N.J.

Filed Jul. 5, 1988, Ser. No. 214,963

Int. Cl.[4] C08K *3/32;* **C09D** *5/18;* **C01B** *25/32, 25/36*

U.S. Cl. 106—18.14 **4 Claims**

1. A phosphate modified hydrotalcite of the following formula:

$$xMgO.Al_2O_3.yPO_4.zH_2O$$

wherein, x, y and z are integers indicating the number of moles present of MgO, PO_4 and H_2O, respectively, said phosphate modified hydrotalcite having a particle morphology of platelets and an average particle size less than about 1 micron.

4,883,534

BENZOIN ANTIMICROBIAL DENTAL VARNISHES

H. J. Sandham, Thornhill, and Thomas E. Balanyk, Toronto, both of Canada, assignors to University of Toronto Innovations Foundations, Toronto, Ontario, Canada

Continuation of Ser. No. 680,936, Dec. 12, 1984, abandoned, which is a continuation-in-part of Ser. No. 493,755, May 11, 1983, Pat. No. 4,496,322. This application Jun. 18, 1987, Ser. No. 63,735

The portion of the term of this patent subsequent to Jan. 29, 2002, has been disclaimed.

Int. Cl.[4] A61K *6/00, 7/16, 9/08*

U.S. Cl. 106—35 **11 Claims**

1. A liquid varnish composition in an orally acceptable liquid vehicle means suitable for dental use and effective in combatting growth of caries-causing bacteria, said composition being capable of drying on teeth to yield at least initially a translucent, transparent or tooth colored film and capable of adherence to the dental infection site,

said composition comprising an effective amount of at least one dentally acceptable antimicrobial means effective against *Streptococcus mutans* and an amount of benzoin effective to form said film and sufficient to permit effective communication of said antimicrobial means with the infection site and sustained release thereof when the composition is applied thereto.

4,883,535

NOVEL HYDRAULIC COMPOSITION

Tetsuo Hamaguchi, Chigasaki; Tsunehisa Ueda, Zushi, and Tadao Natsuume, Yokosuka, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 50,338, May 18, 1987, abandoned. This application Sep. 26, 1988, Ser. No. 249,248

Claims priority, application Japan, May 20, 1986, 61-115635; Jul. 31, 1986, 61-181140; Jul. 31, 1986, 61-181141; Aug. 15, 1986, 61-191528; Sep. 30, 1986, 61-232779; Sep. 30, 1986, 61-232780

Int. Cl.[4] C04B *24/34*

U.S. Cl. 106—93 **19 Claims**

1. A hydraulic composition comprising a hydraulic component and an organic hydrogel holding 5 to 1000 times its own weight of water and obtained by water absorption of highly water-absorbing polymers selected from the group consisting of starch/acrylonitrile graft copolymer and olefin/maleic anhydride copolymers or obtained by reacting a polycarboxylic acid salt selected from the group consisting of polyacrylic acid salts and olefin/maleic anhydride copolymer salts with a crosslinking agent in the presence of water, and optionally aggregate, a reinforcing material selected from the group consisting of pulp fibers, glass fibers, rockwool, resin fibers, carbon fibers and metallic fibers, and other additives selected from the group consisting of binders, air-entraining agents, cement wetting dispersants, expanding agents, water-proofing agents, strength increasing agents, setting accelerators, setting retarders and thickeners.

4,883,536

SUSPENSION OF WATER-SOLUBLE POLYMERS IN AQUEOUS MEDIA CONTAINING DISSOLVED SALTS

Charles L. Burdick, Landenberg, Pa., assignor to Aqualon Company, Wilmington, Del.

Filed Aug. 5, 1988, Ser. No. 229,379

Int. Cl.[4] C08L *1/08;* **C08K** *3/00*

U.S. Cl. 106—194 **26 Claims**

1. An aqueous suspension consisting essentially of greater than 20%, by total weight of the suspension, of at least one anionic or nonionic water-soluble polymer dispersed in an aqueous solution of an ammonium salt having a multivalent anion, wherein the weight ratio of the multivalent ammonium salt to the water in the suspension is at least 0.15.

4,883,537

AQUEOUS SUSPENSION OF CARBOXYMETHYLCELLULOSE

Charles L. Burdick, Landenberg, Pa., assignor to Aqualon Company, Wilmington, Del.

Filed Dec. 28, 1988, Ser. No. 290,973

Int. Cl.[4] C08L *1/08*

U.S. Cl. 106—194 **23 Claims**

1. An aqueous suspension consisting essentially of at least 8%, by weight of the total suspension, of water-soluble carboxymethylcellulose dispersed in an aqueous solution of at least 33%, by weight of the total salt and water, of potassium carbonate.

4,883,538

COLORED THERMAL JOINT COMPOUND

Raymond Marlow, Rte. #6 Eastshore Rd., Rockwall, Tex. 75087; William M. Robertson, 209 Northwood, Lewisville, and Edward J. Burke, 1700 Hearthstone, Plano, both of Tex. 75067

Filed Aug. 8, 1988, Ser. No. 231,372
Int. Cl.[4] C09K *3/00*; C09C *1/02*
U.S. Cl. 106—287.13 5 Claims

1. A colored thermal joint compound comprising:

a heat conductive compound as carrier comprising silicone oil and a colored chalk as colloidal particles, each particle of the colored chalk having a size and preselected color for forming colloidal particles for the heat conductive compound, said colored chalk being mixed with the heat conductive compound in a quantity sufficient to form a colloidal dispersion suitable for use as a preselected thermal joint compound.

4,883,539

COATED SILICATE PARTICLES

Harri O. Mattila, Ulvila, and Pekka J. Eskelinen, Pori, both of Finland, assignors to Kemira Oy, Finland

Filed Mar. 15, 1988, Ser. No. 168,279
Claims priority, application Finland, Apr. 14, 1987, 871644
Int. Cl.[4] C04B *14/20*
U.S. Cl. 106—417 5 Claims

1. A method for the preparation of coated platey silicate particles, characterized in that there is first prepared a preliminary-stage product of coated silicate particles, made up of a substrate and a coating, the coating on them being either poorly soluble in acids or insoluble in acids, and the particles thus obtained are leached either with a mineral acid, or a mineral acid together with some oxidant and without hydrofluoric acid, whereupon the substrate dissolves selectively so that only the silica skeleton is left.

4,883,540

METALLIC SUBSTRATE HAVING AN ADHERENT PHOTO-PRODUCT COATING ON ITS SURFACE AND A METHOD OF COATING SAID METALLIC SUBSTRATE

Robert M. Etter, and Phillip J. Neumiller, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation-in-part of Ser. No. 3,350, Jan. 14, 1987, Pat. No. 4,794,131. This application Feb. 18, 1988, Ser. No. 157,191
The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.
Int. Cl.[4] B08B *7/04*; B32B *15/04*
U.S. Cl. 134—1 23 Claims

3. A metallic substrate having on its surface an adherent photo-product coating, which coating is formed by exposing to light in the presence of an oxygen source, a reactant mixture having a pH from about 7 to 10.5 comprising:

(a) 2,2',4,4'-tetrahydroxybenzophenone;

(b) at least one metal salt wherein the metal is selected from the group consisting of zinc, copper, nickel, silver, iron, manganese, lead, cobalt, zirconium, mercury, palladium, cadmium, ruthenium, rhodium, and mixtures thereof; and

(c) at least one amine;

in a solvent.

20. A method of cleaning a metallic substrate comprising the steps of:

(A) forming an adherent photo-product coating on the surface of said substrate by:

(1) preparing a reactant mixture of claim 3;

(2) contacting said substrate with said reactant mixture; and

(3) exposing said reactant mixture in contact with said substrate to light in the presence of an oxygen source; and

(B) removing said photo-product coating from the surface of said substrate.

4,883,541

NONCHROMATE DEOXIDIZER FOR ALUMINUM ALLOYS

Maher E. Tadros, Ellicott City, Md., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Jan. 17, 1989, Ser. No. 297,829
Int. Cl.[4] B08B *3/08*
U.S. Cl. 134—3 55 Claims

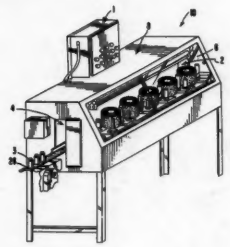
45. A process for deoxidizing and desmutting aluminum and aluminum alloy articles which comprises immersing such articles in an aqueous solution consisting essentially of nitric acid and a halate salt selected from the group consisting of alkali metal bromates, chromates, an iodates, for a period of at least 1 second.

4,883,542

METHOD AND APPARATUS FOR CLEANING CONTAINERS

John Voneiff, 623 South Caroline St., Baltimore, Md. 21231

Filed Dec. 22, 1987, Ser. No. 136,323
Int. Cl.[4] B08B *1/02*
U.S. Cl. 134—21 2 Claims



1. A method for cleaning particulate matter from container bodies comprising:

(a) moving the container bodies through a station;

(b) subjecting said containers to an ionization atmosphere while moving through said station;

(c) wiping particulate matter from said container bodies within said station;

(d) subjecting said wiping element to a vacuum for removing particulate material therefrom;

(e) said step of subjecting said container bodies to an ionization atmosphere including moving ionized air over said containers while moving through said station;

(f) the step of moving ionized air over said container bodies including moving said air during and after said wiping step;

(g) said wiping step including arranging a series of brushes along a linear path, and rotating said brushes about a fixed axis of rotation, and said container bodies being maintained in a path for movement adjacent to said brushes for engagement thereby to wipe a particulate matter therefrom;

(h) said step of subjecting said wiping element to a vacuum including applying the vacuum at a position on a rotating brush remote from a path of movement from said container bodies;

(i) said vacuum being applied along a narrow band substantially the entire width of each brush;

(j) a series of brushes being arranged in a line parallel to the path of said container bodies, and each brush being subjected to an independent vacuum band to remove the particulate matter therefrom;

(k) the step of moving said container bodies through the station including arranging a series of bottles in spaced relationship while in the station such that each bottle

moves at a fixed rate past the brushes and at a fixed relationship between adjacent bodies;

(l) said step of moving ionized air including passing air over ion bars to ionize the air prior to passing the air over said bottles as they move through the station; and

(m) said ionized bars being located in a position above the path of movement of said bottles and air being moved from a position above the bar such that it flows over the bars to be ionized and then passes over the bottles as they move along the fixed path.

4,883,543

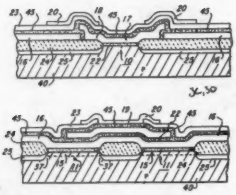
SHIELDING FOR IMPLANT IN MANUFACTURE OF DYNAMIC MEMORY

Richard N. Gossen, Jr., Sugarland; William C. Bruncke, Houston, and Gordon D. Baker, Lubbock, all of Tex., assignors to Texas Instruments Incroporated, Dallas, Tex.

Filed Jun. 5, 1980, Ser. No. 156,533

Int. Cl.[4] H01L *21/265, 21/28*

U.S. Cl. 437—37 **6 Claims**



1. A method of making a semiconductor device such as an array of memory cells of the one-transistor type, comprising the step of:

applying conductive areas such as transistor gates and capacitor gates to a face of a semiconductor body separated from the face by a thin dielectric, wherein the body is P-type silicon, and the conductive areas include conductive material which is polycrystalline silicon,

coating said entire face with a thin layer of insulating material which acts as a shield against electrostatic build-up on said conductive areas,

subjecting said face to an ion implant to create heavily doped N+ semiconductor regions in said face, wherein said implant is arsenic,

wherein said step of coating includes thermal oxidation, the thickness of the coating being much greater over said polycrystalline silicon than over exposed single crystal silicon.

4,883,544

PROCESS FOR PREPARATION OF AUSTENITIC STAINLESS STEEL HAVING EXCELLENT SEAWATER RESISTANCE

Masanori Ueda; Masayuki Abe, both of Kitakyushu; Kensai Shitani, Hikari; Tetsuo Yoshimoto; Hiroki Yamamoto, both of Kitakyushu, and Fumio Kurosawa, Kawasaki, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 282,110

Claims priority, application Japan, Dec. 12, 1987, 62-314834

Int. Cl.[4] B22D *25/06*

U.S. Cl. 148—2 **17 Claims**

1. A process for the preparation of an austenitic stainless steel having an excellent seawater resistance, which comprises pouring a melt of an austenitic stainless steel containing 3 to 13% by weight of Mo in a casting mold and forming a cast piece by continuous casting, wherein the temperature of the melt poured into the casting mold is controlled so that the temperature of the melt is higher by at least 25° C. than the melting point of the alloy, to form a cast piece in which the equiaxed zone ratio in the section of the cast piece is lower than 25%, and then heating treating, hot rolling and annealing the cast piece.

4,883,545

PROCESS FOR MAKING A METALLIC ARTICLE WITH IMPROVED RESISTANCE TO SURFACE CRACKING DURING COLD FORMING

David K. Matlock, Golden; Michael P. Riendeau, Lakewood, both of Colo., and Mark L. Robinson, Wyomissing Hills, Pa., assignors to Colorado School of Mines, Golden, Colo.

Filed Sep. 1, 1988, Ser. No. 239,457

Int. Cl.[4] C22C *8/06*

U.S. Cl. 148—12 B **10 Claims**

1. A process for making a metallic article with improved resistance to surface cracking during cold forming, comprising the steps of:

providing a substantially cylindrical starting metallic form which has been previously worked, with or without thermal treatment;

compressively working said starting form by axisymmetrically reducing the cross-sectional area thereof so as to provide an intermediate form having a strain gradient between the surface and the center of said intermediate form, said compressive working being carried out below the recrystallization temperature of the metallic material, said axisymmetric reduction being carried out in a deformation zone having a deformation zone geometry parameter (Δ) of at least about 8; and then

thermally treating said intermediate form to at least partially recrystallize the metallic material near the surface but with no significant grain growth;

said strain gradient being such that the strain near the surface of said intermediate form is great enough to result in a relatively fine-grained structure near the surface of the thermally treated intermediate form and the strain near the center of said intermediate form is low enough to result in a relatively coarse-grained structure near the center of the thermally treated intermediate form.

4,883,546

PROCESS FOR THE MANUFACTURE OF WOOD FIBER BOARDS

Otto Kunnemeyer, Paschenburg 5, 4934 Horn-Bad Meinberg 1, Fed. Rep. of Germany

Filed Aug. 17, 1987, Ser. No. 86,406

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1986, 3629586

Int. Cl.[4] B29C *67/02*; B32B *31/20, 31/22*

U.S. Cl. 156—62.2 8 Claims

1. A process for the manufacture of wood fiber boards comprising the steps of,

coating wood fibers with adhesive,

forming the same into a fiber web,

covering the wood fiber web on both sides with a layer comprising substantially entirely fine wood dust to a predetermined thickness,

subjecting the web and the layers thereon to heat and pressure to compact the same into a board, and,

removing substantially the entire wood dust layers,

thereby to produce a wood fiber board wherein the wood fibers thereof have not been subjected to any substantial surface removal.

4,883,547

METHOD OF FORMING A HIGH EFFICIENCY RESPIRATOR

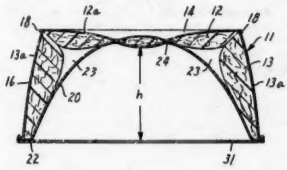
Daniel A. Japuntich, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 22,258, Mar. 2, 1987, Pat. No. 4,827,924.

This application Mar. 1, 1989, Ser. No. 317,530

Int. Cl.[4] B32B *31/16*

U.S. Cl. 156—73.4 13 Claims



1. A method for producing a mask blank comprising the steps of:

bonding two sheets of filter material together along a pair of oppositely disposed arches, one of said sheets having a slot lying between said arches;

removing the sheet lying outside of said arches to form a filter blank;

opening said filter blank along said slot so as to form a cup-like filter member having a pair of side wall portions formed from said sheet having a slot and a frontal portion formed from the other sheet which bridges said sidewall portions.

4,883,548

PROCESS FOR PRODUCING LAMINATED OPHTHALMIC LENS

Fumio Onoki, Tokorozawa, Japan, assignor to Hoya Corporation, Tokyo, Japan

Filed Apr. 21, 1988, Ser. No. 184,426

Claims priority, application Japan, Apr. 24, 1987, 62-101486

Int. Cl.[4] B32B *31/12, 17/06*

U.S. Cl. 156—99 3 Claims

1. A process for producing an ophthalmic lens which is a laminate of a first lens element and a second lens element, which process comprises the sequential steps of:

(I) providing a plurality of first and second lens elements, each of said first and second lens elements having predetermined lens optical values and anterior and posterior surfaces, wherein only said anterior surfaces of said first lens elements and said posterior surfaces of said second lens elements have been surface-treated to form thereon at least one layer selected from a tinted layer, a protective film layer and an anti-reflection film layer, whereby said posterior surfaces of said first lens elements and said anterior surfaces of said second lens elements are untreated;

(II) selecting one of said first lens elements and one of said second lens elements on the basis of an ophthalmic prescription so that said selected first and second lens elements collectively provide a desire dophthalmic correction according to said prescription when said selected first and second lens elements are laminated one to another; and

(III) laminating said selected first and second lens elements one to another by overlaying said untreated posterior surface of said selected first lens element onto said untreated anterior surface of said selected second lens element, and adhesively bonding said untreated posterior and anterior surfaces of said first and second lens elements, respectively, one to another, thereby to form a laminated ophthalmic lens of said desired prescription.

4,883,549

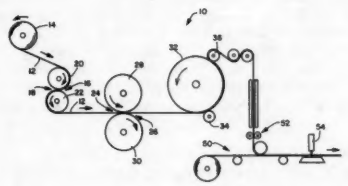
METHOD OF ATTACHING A COMPOSITE ELASTIC MATERIAL TO AN ARTICLE

Johnathan E. Frost, Paris, Tex.; Eric T. Hsu; David M. Jackson, both of Roswell, Ga.; Thomas G. Olsen, Neenah, and Robert L. Popp, Hortonville, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Dec. 6, 1988, Ser. No. 280,465

Int. Cl.[4] B32B *31/16*

U.S. Cl. 156—161 20 Claims



1. A method for attaching a composite elastic material to a gatherable article comprising the steps of:

providing a composite elastic material including at least one elastic sheet joined to at least one gatherable layer at least at two locations, said gatherable layer being gathered between said locations;

stretching said composite elastic material so that said gatherable layer is at least partially extended between the locations where the gatherable layer is joined to the elastic sheet;

compressing said stretched composite elastic material to press at least a portion of said gatherable layer against at

least a portion of said elastic sheet to temporarily inhibit total recovery of said composite elastic material;

attaching said temporarily inhibited composite elastic material to said gatherable article at least at two locations,

wherein said temporarily inhibited composite elastic material is adapted, upon recovery, to gather said gatherable article.

4,883,550

METHOD OF MANUFACTURING FIBER-REINFORCED ARTICLES OR PLASTICS MATERIAL

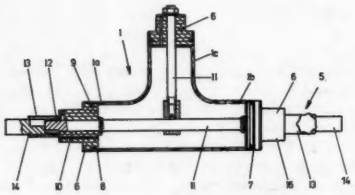
Friedhelm Overath, and Michael Weyer, both of Schaffhausen, Switzerland, assignors to Georg Fischer AG, Schaffhausen, Switzerland

Filed Apr. 26, 1988, Ser. No. 186,150

Claims priority, application Switzerland, Apr. 30, 1987, 01650/87

Int. Cl.[4] B29C *41/14*

U.S. Cl. 156—171 **5 Claims**



1. In a method of manufacturing a fiber-reinforced shaped article of plastics material for pipeline systems, the article including an inner casing of injection-molded thermoplastic material, the inner casing having tubular ends, and an outer casing of a fiber winding impregnated with synthetic resin, the method including winding a dry glass fiber fabric tape in accordance with a given program onto the inner casing, the tape being wound onto the inner casing so that at least the entire surface thereof is covered, immersing the article formed of the inner casing and the tape wound thereon into a resin bath while a negative pressure is maintained, the resin bath containing an ultraviolet light-setting resin, subsequently subjecting the resin bath to atmospheric pressure, the improvement comprising inserting a bushing in each tubular end, prior to winding the tape onto the inner casing, mounting the bushings on a support mandrel, closing the tubular ends by means of cover caps after the tape has been wound on the inner casing, wherein at least one of the cover caps includes a venting hose, such that the interior of the article is connected to the ambient pressure acting on the resin bath, removing the impregnated article from the resin bath and hardening the resin by means of ultraviolet light while the article is simultaneously rotated.

4,883,551

MANUFACTURE OF FLEXIBLE SHEET MATERIAL

Arthur Britton, High Eldwick, nr Bingley, England, assignor to Courtaulds PLC, London, England

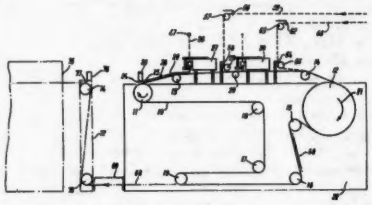
Continuation of Ser. No. 699,850, Feb. 8, 1985, abandoned. This application May 26, 1987, Ser. No. 54,057

Claims priority, application United Kingdom, Feb. 10, 1984, 8403622

Int. Cl.[4] B32B *5/08, 5/02*

U.S. Cl. 156—178 **14 Claims**

1. A method of manufacturing reinforced sheet material for conveying purposes by incorporating strands in a binding material, said method comprising the steps of: providing a supply of a settable bonding material comprising a natural or synthetic resin in a flowable paste-like condition above a moving supporting surface, causing material from the supply to flow onto the supporting surface so as to form a coherent layer of bonding material on the surface, which layer is such that it will flow well enough to allow entry into it of the strands and will have sufficient material to encompass the strands completely; laying strands so that they traverse the layer of bonding material; driving the strands into the layer of bonding material before the material sets so that the bonding material surrounds the strands; and treating the bonding material to form it into a solid, flexible sheet material having the strands embedded therein.



4,883,552

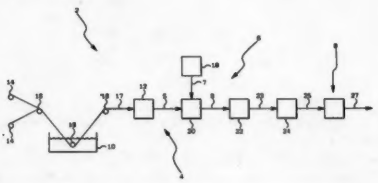
PULTRUSION PROCESS AND APPARATUS

James E. O'Connor; William H. Beever; Jeffrey W. Dancer; William B. Beaulieu; Larry M. Selby, and Virgil H. Rhodes, Jr., all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 6, 1986, Ser. No. 938,689

Int. Cl.[4] D04H *3/08*

U.S. Cl. 156—180 **22 Claims**



1. A continuous process for consolidating and shaping a plurality of preformed continuous prepreg-type structures into a unitary formed product structure, each such prepreg-type structure comprising long reinforcing fibers in a solidified thermoplastic resin matrix, said process comprising the steps of continuously and sequentially

(a) positioning the respective members of said plurality of prepreg-type structures together in a predetermined interfacially overlapping relationship relative to one another along their respective lengths,

(b) passing the resulting so positioned plurality of structures through at least one heated die zone, each such zone being adapted both to heat said plurality of structures to a temperature that is above the fusion bonding temperature for said themoplastic resin matrix and to pressure said plurality of structures selectively whereby said plurality of structures is conformed by said passing into said unitary formed structure having a predetermined consolidated cross-sectional configuration, and

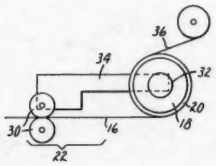
(c) cooling said so formed structure while retaining the form thereof.

4,883,553

PAD FORMING METHOD

John R. David, White Bear Lake Township, Ramsey County, and Daniel P. Pohl, Grant Township, Washington County, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 10,213, Feb. 3, 1987, Pat. No. 4,842,919.
This application Nov. 22, 1988, Ser. No. 274,988
Int. Cl.[4] B65H *81/00*
U.S. Cl. 156—193 5 Claims



1. A method form forming pads of pressure sensitive adhesive coated sheets with a similar discontinuity on each sheet substantially aligned with the discontinuity on adjacent sheets in the pad, said method comprising the steps of:

helically winding a strip of pressure sensitive adhesive coated material around the periphery of a roller to form a roll comprising a multiplicity of overlying layers of the strip by rotating the roller about its axis to pull the strip along a predetermined path onto the roller;

forming discontinuities on the strip along the predetermined path at locations that are progressively increasingly spaced apart to compensate for the increasing circumference of the roll and which result in the location of at least one set of discontinuities along the periphery of the roller in substantial alignment radially outwardly of the roller; and

cutting at least one pad containing at least one set of aligned discontinuities from the roll.

4,883,554

PLAQUE AND METHOD OF MAKING SAME

Sam Bida, 2160 Crawford St., Ely, Nev. 89301

Filed Sep. 23, 1987, Ser. No. 100,356
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—219 16 Claims

6. The method of making a plaque comprising, providing a thin sheet of metal foil having an upper viewing surface, applying a layer of fixative to said viewing surface, inserting said sheet of metal foil about the curved platen of a conventional typewriter, typing information onto said sheet by conventional typing strokes to form indentations into said viewing surface ad deposit material a high degree of visibility in the bottom of said indentations so that information may be readily perceived by the human eye, removing said sheet of metal foil from the platen of said typewriter, applying a further layer of fixative to said indented viewing surface, mounting said indented sheet on a base, and providing a layer of transparent protective material over the viewing surface of said sheet to permanently preserve the information while enabling an observer to read information through said protective layer.

4,883,555

METHOD FOR FORMING FOAM BRACED PACKAGING

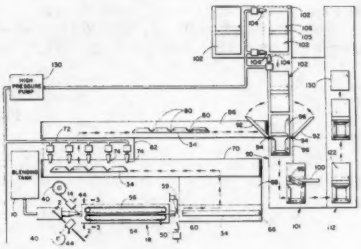
Christina M. Turngren, 339 Chestnut St., St. Paul, Minn. 55102

Filed Aug. 11, 1987, Ser. No. 84,425
Int. Cl.[4] B32B *31/18*
U.S. Cl. 156—227 14 Claims

1. Apparatus for forming custom-sized foam braced packaging, comprising:

(a) means for forming foam into a rail of desired cross-sectional and length dimensions;

(b) means for shaping said foam rail into a multi-sided foam frame in which remote ends of said rail are joined;



(c) means for cutting reinforced packaging material to a length and width corresponding to the foam frame; and

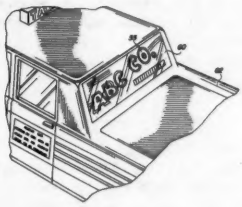
(d) means for adhering said packaging material to said frame.

4,883,556

METHOD FOR APPLYING INFORMATION TO A TRANSPARENT SURFACE

Edward J. Leavitt, Sr., 823 Fontana, Richardson, Tex. 75080, and Edward J. Leavitt, Jr., 535 E. Charleston, Phoenix, Ariz. 85022

Filed Apr. 21, 1986, Ser. No. 854,405
Int. Cl.[4] B32B *31/28*
U.S. Cl. 156—273.3 3 Claims



1. A method of applying informational images to a surface such as a vehicle window comprising:

(a) providing a perforated polymeric substrate of predetermined size;

(b) coating a surface of said perforated polymeric substrate with a photo coat emulsion;

(c) applying a mask to the coated polymeric substrate in selected areas to define image-bearing areas corresponding to the areas of the substrate immediately beneath said mask;

(d) exposing the polymeric substrate to light;

(e) removing the mask from the substrate;

(f) washing the polymeric substrate to remove the emulsion from the image areas;

(g) silkscreening at least predetermined portions of said image areas to impart images thereon; and

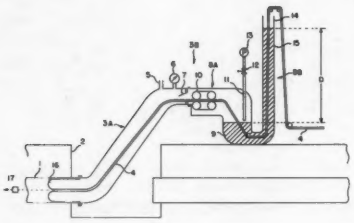
(h) adhesively securing the substrate to said window.

4,883,557

METHOD FOR LINING PIPE LINES WITH A PRESSURIZED GAS

Akio Morinaga, Fujisawa; Isaburo Yagi, Amagasaki; Hideo Maruyama, Osaka, and Akifumi Yamamoto, Takatsuki, all of Japan, assignors to Tokyo Gas Co., Ltd., Tokyo and Ashimori Industry Co., Ltd., Osaka, both of, Japan

Filed Aug. 26, 1988, Ser. No. 236,995
Claims priority, application Japan, Aug. 26, 1987, 62-212464
Int. Cl.[4] B29C *63/36*
U.S. Cl. 156—287 3 Claims



1. A method for lining pipe lines which comprises inserting a flexible tubular lining material provided on the inner surface thereof with a binder and on the outer surface thereof with an air-impervious coating into a pipe line through an induction pipe, with the front end of the lining material being fixed annularly to one end of the pipe line to form a turning point of evagination, and allowing the tubular lining material to advance within the pipe line while moving the turning point of evagination forwards from one end to the other end of the pipe line to turn the tubular lining material inside out under fluid pressure thereby applying the evaginated tubular lining material onto the inner surface of the pipe line over its full length with the binder on the exterior surface of the evaginated tubular lining material being interposed between the pipe line and the tubular lining material, characterized in that a portion of the tubular lining material positioned in rear of the pipe line is passed through open air and then through an elevated tower filled with a liquid and then through a confined space, the liquid isolating the confined space from the open air, and a pressurized gas is introduced into the confined space to produce the pressure for moving the turning point of evagination forwards.

4,883,558

METHOD AND APPARATUS FOR BONDING PAIRS OF MOLD SHELLS INTO MOLDS

Kenneth E. Bellis, Rochester; Jackson E. Brown, Mt. Clemens; Pheroze J. Nagarwalla, Rochester Hills, all of Mich.; William Niedermeyer, Willowick, and Paul Pawlak, Mentor, both of Ohio, assignors to Roberts Corporation, Lansing, Mich.

Filed Sep. 23, 1988, Ser. No. 248,513
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—292 24 Claims

1. Apparatus for bonding a pair of mold shells (**28***a*, **28***b*) into a mold, characterized by:

a base (**42**) upon which one of said mold shells (**28***b*) can be supported;

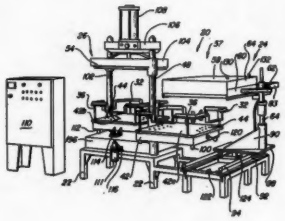
a frame (**22**);

means (**46**, **48**) for pivotally mounting said base (**42**) on said frame (**22**) whereby said mold shells (**28***a*, **28***b*) may be pivoted about an axis between first and second workstations (**24**, **26**);

means (**57**) at said first workstation (**24**) for applying an adhesive to said one mold shell (**28***b*), said adhesive applying means (**58**) including

(1) an adhesive applicator (**58**) including a supply (**73**) of said adhesive for dispensing said adhesive from said supply thereof onto said one mold shell (**28***b*), and

(2) means (**62**, **62**, **90**, **88**, **92**, **94**) for mounting said applicator (**58**) for shifting movement between a standby position spaced from said first workstation (**24**) to allow said mold shells to be placed onto said base (**42**), and an operative position at said first workstation (**24**) disposed over said one mold shell (**28***b*) on said base (**42**),



(3) controllable motor means (**96**) coupled with said applicator (**58**) for shifting said applicator (**58**) between said standby position and said operative position;

control means (**110**) for controlling the operation of said motor means (**76**); and

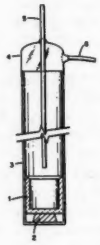
means (**54**, **104**, **108**) at said second workstation (**26**) for pressing said mold shells (**28***a*, **28***b*) together after said base (**42**) is pivoted from said first workstation (**24**) to said second workstation (**26**).

4,883,559

PROCESS FOR MAKING TRANSITION METAL NITRIDE WHISKERS

Carlos E. Bamberger, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 12, 1988, Ser. No. 180,753
Int. Cl.[4] C01B *21/06*, *21/076*; C30B *1/10*
U.S. Cl. 156—603 4 Claims



1. A process for making transition metal nitride whiskers comprising;

contacting a cyanide salt with a first compound selected from the group transition metal nitrides, transition metal oxides and a second compound selected from the group free alkali metal oxides and alkali metal oxides that are associated with anions that are not strong oxidants which would interfere with the reducing properties of the cyanide to form a mixture;

heating said mixture to a temperature of about 1000° C. for not less than 15 hours in an inert atmosphere.

3. A process for making transition metal nitride whiskers comprising;

contacting a cyanide salt with an alkali metal metallate to form a mixture;

heating said mixture to a temperature of about 1000° C. for not less than 15 hours in an inert atmosphere.

4,883,560

PLASMA TREATING APPARATUS FOR GAS TEMPERATURE MEASURING METHOD

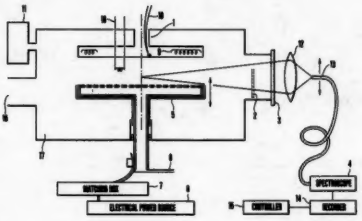
Shin-ichiro Ishihara, Takatsuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 13, 1989, Ser. No. 309,292

Claims priority, application Japan, Feb. 18, 1988, 63-35707

Int. Cl.[4] B44C *1/22;* B05D *3/06;* C23C *16/00, 14/00*

U.S. Cl. 156—626 6 Claims



2. A plasma temperature measuring method, comprising steps of

calculating a theoretical nitrogen plasma emission intensity at various gas temperatures,

measuring an actual nitrogen plasma emission intensity in a plasma treating room,

comparing said measured emission intensity with said calculated emission intensity at a peak spectrum in a range from 400 nm to 406 nm among dissociated emission spectra of nitrogen molecules,

distinguishing, through said comparison, a temperature rise of nitrogen gas caused by said electric power source for generating plasma from a temperature rise caused by heated bodies such as a substrate, a substrate holder and the like or by local heat sources or abnormal electric discharges.

4,883,561

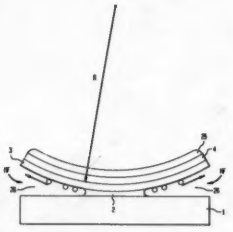
LIFT-OFF AND SUBSEQUENT BONDING OF EPITAXIAL FILMS

Thomas J. Gmitter, Lakewood, and Eli Yablonovitch, Middletown Township, Monmouth County, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Continuation-in-part of Ser. No. 174,852, Mar. 29, 1988, Pat. No. 4,846,931. This application Dec. 5, 1988, Ser. No. 279,217

Int. Cl.[4] H01L *21/306;* B44C *1/22;* C03C *15/00, 25/06*

U.S. Cl. 156—633 19 Claims



1. A process for selectively freeing an epitaxial film from a single crystal substrate upon which it was grown, said method comprising the steps of

selectively etching away a thin release layer positioned between said film and said substrate and causing edges of said film to curl upwardly as said release layer is etched away to enhance the outdiffusion of reaction products of the etching step from an active etching area,

adhering said film to a second substrate, and depositing at least one semiconductor layer on said film adhered to said substrate.

4,883,562

METHOD OF MAKING A PHOTOSENSOR

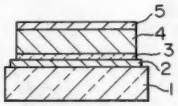
Hirofumi Ogawa; Kenji Sameshima, both of Hachioji; Tadaaki Hirai, Koganei; Takaaki Unnai; Masanao Yamamoto, both of Mobara; Keiichi Shidara, Tama; Junichi Yamazaki, Kawasaki; Eikiyu Hiruma, Komae, and Shirou Suzuki, Yokosuka, all of Japan, assignors to Hitachi, Ltd. and Nippon Hoso Kyokai, both of Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 301,467

Claims priority, application Japan, Jan. 28, 1988, 63-15940

Int. Cl.[4] B44C *1/22;* C03C *15/00, 25/06*

U.S. Cl. 156—643 12 Claims



1. A method of making a photosensor, comprising the steps of:

ion etching away a predetermined surface of a substrate;

forming an electrode on the etched-away surface of the substrate; and

forming on the electrode a photoconductive layer mainly made of an amorphous semiconductor such that the photoconductive layer is put in rectifying contact with the electrode.

4,883,563

METHOD OF MANUFACTURING A THIN GLASS MEMBRANE

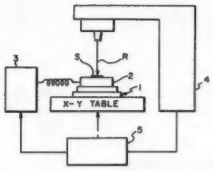
Haruo Kotani; Katsuhiko Tomita; Takaaki Yada, and Tsuyoshi Nakanishi, all of Miyanohigashi, Japan, assignors to Horiba, Ltd., Tokyo, Japan

Division of Ser. No. 124,567, Nov. 24, 1987, Pat. No. 4,816,132. This application Oct. 28, 1988, Ser. No. 264,143

Claims priority, application Japan, Nov. 27, 1986, 61-283802; Nov. 28, 1986, 61-285371

Int. Cl.[4] B44C *1/22;* C03C *15/00, 25/06*

U.S. Cl. 156—645 23 Claims



1. A method of manufacturing a thin pH-responsive glass membrane, comprising the steps of:

providing a glass ingot;

cutting the glass ingot to form a glass sheet of approximately a predetermined thickness;

adjusting the thickness of the glass sheet, if necessary, to the predetermined thickness;

heating the glass sheet to a temperature below its melting point;

applying additional heat energy to the heated glass sheet of an amount to uniformly melt only its surface, and

solidifying the melted surface to form the pH-responsive glass membrane.

4,883,564

CREPING DEVICE ADHESIVE FORMULATION

Patrick P. Chen, Sewell, N.J.; Taiwoo Chiu, Springfield, and J. Richard Skerrett, Bala Cynwyd, both of Pa., assignors to Scott Paper Company, Philadelphia, Pa.

Filed Jun. 1, 1988, Ser. No. 201,496

Int. Cl.[4] D21H *5/24*

U.S. Cl. 162—112 **3 Claims**

1. In a process of treating a paper web by applying an adhesive composition to a creping surface and creping the web from said surface, the improvement which consists of employing an adhesive composition comprising a water soluble binder and a phosphate salt present in an amount from 1–15% by weight of the solids content of the adhesive.

4,883,565

PROCESS FOR ELECTROPHORETIC WHITE AND COLORED ENAMELLING

Bruno Hees, Langenfeld, and Hans Hoffmann, Leichlingen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 24, 1988, Ser. No. 159,909

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1987, 3707401

Int. Cl.[4] B05D *3/02*

U.S. Cl. 204—180.2 **4 Claims**

1. In an improved method for the electrophoretic application of enamel in white or colors to sheet steel by a two layer/-single stoving process, the improvement comprises the first of the two layers consisting essentially of an enamel which has the following properties:

(a) a coefficient of expansion below 165×10^{-7}/K at 0° to 100° C.,

(b) a surface tension higher than 300 mN/m,

(c) a transformation temperature of from 480° to 520° C.,

(d) a yield value of 15 to 30 and

(e) high viscosity.

4,883,566

ELECTRODE ASSEMBLY FOR IN-SITU MEASUREMENT OF ELECTROLYTIC CONDUCTIVITY OF BOILER WATER

John A. Muccitelli, Feasterville, and Nancy A. Feldman, Trevose, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

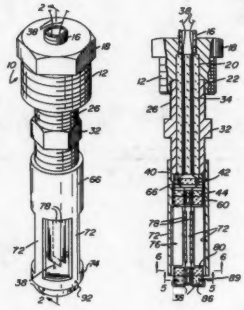
Filed Jun. 7, 1988, Ser. No. 203,779

Int. Cl.[4] G01N *27/02, 27/26*

U.S. Cl. 204—1 T **18 Claims**

1. An electrode assembly for in situ measurement of physical constants of boiler water at elevated temperature and/or pressure and under variable boiler operating conditions wherein pH can vary between 7 and at least 11, said electrode assembly comprising electrodes supported by stabilized zirconia and wherein electrical current generated by said electrodes in contact with the boiler water is conducted by conductive leads supported by said stabilized zirconia, said zirconia being stabilized with about 6% calcia and 3% hafnia or about 1 to 3% magnesia and 1 to 2% hafnia.

10. A method of insulating and using an electrode assembly for performing in situ measurement of physical constants of boiler water at elevated temperature and/or pressure, at variable boiler operating conditions wherein pH can vary between 7 and at least 11, said method comprising protecting and supporting electrodes of the assembly with stabilized zirconia, the electrodes of the assembly in said boiler water, transmitting electrical current generated by said electrodes by conductive leads supported by said stabilized zirconia, with said zirconia



being stabilized with about 6% calcia and 3% hafnia or about 1 to 3% magnesia and 1 to 2% hafnia, and determining a value by reading the generated eletrical current passing through said electrodes.

4,883,567

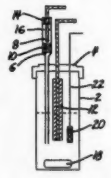
METHOD OF PLATING METALLO-GALLIUM FILMS

Mark W. Verbrugge, Troy, and Michael K. Carpenter, Warren, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 26, 1988, Ser. No. 236,871

Int. Cl.[4] C25D *3/66*

U.S. Cl. 204—39 **6 Claims**



1. A method for the electrocodeposition of a substantially uncontaminated microcrystalline film having substantially equal atomic portions of gallium and a metal selected from the group consisting of arsenic, aluminum and antimony comprising the steps of:

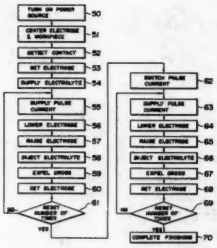
immersing a conductive substrate opposite a counterelectrode in an organochlorogallate melt consisting essentially of a salt of said metal and a $GaCl_3$-dialkylimidazolium chloride wherein (1) the alkyl groups comprise no more than four carbons, (2) the molar ratio of the dialkylimidazolium chloride to the $GaCl_3$ is at least 1 but less than about 20, and (3) the molar ratio of the metal salt to the $GaCl_3$ is less than 0.5;

and cathodizing said substrate at a potential selected to codeposit said gallium and metal at substantially equal rates onto said substrate.

4,883,568
FINISHING METHOD EMPLOYING ELECTRO-CHEMICAL PROCESS

Yohei Kuwabara, Fukuroi, and Teruo Asaoka, Kakegawa, both of Japan, assignors to Shizuoka Seiki Co., Ltd., Shizuoka, Japan

Filed Dec. 16, 1988, Ser. No. 285,853
Claims priority, application Japan, Feb. 13, 1988, 63-31499
Int. Cl.[4] B23H *3/00*
U.S. Cl. 204—129.43 **1 Claim**



1. A finishing method employing electro-chemical process, comprising the steps of: supplying identical electrical pulses between an electrode and a workpiece disposed opposite to each other in a stationary electrolyte with a predetermined gap therebetween; reducing said gap after said pulses have been supplied; thereafter enlarging said gap; and injecting electrolyte into said gap at least during said step of enlarging said gap.

4,883,569
METHOD FOR THE PREPARATION OF A CYCLOALKYL SILANE COMPOUND

Mikio Endo; Minoru Takamizawa; Toshinobu Ishihara; Tohru Kubota, all of Niigata, and Toshio Shinohara, Gunma, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 11, 1988, Ser. No. 154,691
Claims priority, application Japan, Feb. 13, 1987, 62-30994
Int. Cl.[4] B01J *19/2*
U.S. Cl. 204—157.74 **9 Claims**

1. A method for the preparation of a cycloalkyl silane compound which comprises:

(A) admixing an unsaturated cyclic hydrocarbon compound represented by the general formula

$$C_mR^1{}_nA_p,$$

in which R^1 is a hydrogen atom, a fluorine atom or a fluorine-substituted or unsubstituted monovalent hydrocarbon group having 1 to 8 carbon atoms, A is a divalent intramolecular bridging group selected from methylene group $>CH_2$ and dimethylmethylene group $>C(CH_3)_2$, m is an integer of 4 to 8, p is zero or 1 and n is an integer given by $n=2m-2p-2$, with a hydrogen silane compound represented by the general formula

$$HR^2{}_qSiX_{3-q},$$

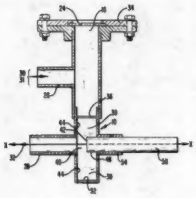
in which R^2 is an unsubstituted or substituted monovalent hydrocarbon group, X is a halogen atom or an alkoxy group and q is zero, 1 or 2, and a platinum catalyst prepared by heating chloroplatinic acid in an alcohol, to form a reaction mixture; and

(B) irradiating the reaction mixture with light to effect the hydrosilylation reaction between the unsaturated cyclic hydrocarbon compound and the hydrogen silane compound.

4,883,570
APPARATUS AND METHOD FOR ENHANCED CHEMICAL PROCESSING IN HIGH PRESSURE AND ATMOSPHERIC PLASMAS PRODUCED BY HIGH FREQUENCY ELECTROMAGNETIC WAVES

Philip C. Efthimion, Bedminister, and Dennis J. Helfritch, Flemington, both of N.J., assignors to Research-Cottrell, Inc., Somerville, N.J.

Filed Jun. 8, 1987, Ser. No. 60,048
Int. Cl.[4] H01J *7/46, 19/80, 19/12*
U.S. Cl. 204—164 **63 Claims**



1. An apparatus which creates a plasma for chemical processing of gaseous fluid comprising:

(a) an electro-magnetic resonator cavity having first and second conductive walls and a resonant frequency;

(b) an electro-magnetic energy source which produces electro-magnetic energy having a frequency corresponding to said resonant frequency and a power level sufficient for breaking down said gaseous fluid and creating a plasma within said electro-magnetic resonator cavity;

(c) an electro-magnetic wave guiding structure connecting said electro-magnetic energy source to the first wall of said electro-magnetic cavity, the first wall having an aperture therein and the wave guiding structure coupling said electro-magnetic energy into an interior of said electro-magnetic cavity through said aperture;

(d) the wave guiding structure having an intake port for introducing said gaseous fluid into said wave guiding structure;

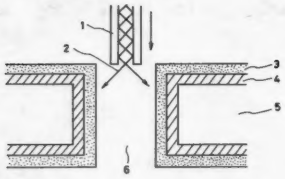
(e) the second wall of the resonator cavity having an exhaust port for discharging processed gaseous fluid in the form of a plasma from said cavity; and

(f) plasma confinement means for causing said gaseous fluid to flow into said electro-magnetic resonator cavity through said aperture along with the electro-magnetic energy for confining and stabilizing said plasma within said electro-magnetic resonator cavity.

4,883,571
PROCESS FOR PREPARING A PRINTED-CIRCUIT BOARD

Toshio Kondo, and Yoshimasa Kinaga, both of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Amagasaki, Japan

Filed Jan. 25, 1988, Ser. No. 147,894
Claims priority, application Japan, Jan. 26, 1987, 62-15602
Int. Cl.[4] H05K *3/06*; C25D *15/00*
U.S. Cl. 204—180.6 8 Claims



1. Improved process for preparing a printed-circuit board, which process comprises the steps of:

(a) subjecting a copper-plated, laminated, insulative plate for use in a printed circuit and having through-holes to electrodesposition coating in a photo-curable electrodeposition coating composition bath to form a resist film on the surface of a copper foil of the copper-plated, laminated, insulative plate;

(b) lapping a wiring pattern mask on the resist film so that a through-hole wall area can form an exposed area;

(c) exposing the resist film to ultraviolet light through the lapped wiring pattern mask;

(d) removing the wiring pattern mask to from the resist film;

(e) removing the resist film not exposed under the wiring pattern mask to form an etching resist pattern film on the plate;

(f) etching away the exposed copper foil; and

(g) removing the etching resist pattern film, the improvement comprising, after the step of (d) removing the wiring pattern mask from the resist film, exposing the resist film in the through-hole wall area to ultraviolet light through an optical fiber having a shape capable of passing through the through-hole, the ultraviolet light emitted from an emitter of the optical fiber being irradiated onto the resist film in the though-hole wall area as the emitter of the optical fiber passes through the through-hole reciprocally throughout the through-hole.

4,883,572
CONTROLLED FILM BUILD EPOXY COATINGS APPLIED BY CATHODIC ELECTRODEPOSITION

Nancy A. Rao, and Richard A. Hickner, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 2, 1987, Ser. No. 69,475
Int. Cl.[4] C25D *13/06*
U.S. Cl. 204—181 F 8 Claims

1. In a process of coating a cationic, epoxy resin-based composition onto an object having an electroconductive surface by steps comprising immersing the electroconductive object into a coating bath comprising an aqueous dispersion of cationic particles of the epoxy-based composition, passing an electric current through said bath sufficient to electrodeposit a coating of said composition on the object by providing a difference of electrical potential between the object and an electrode that is (a) spaced apart from said object (b) in electrical contact with said bath and (c) electrically positive in relation to said object; the improvement which comprises using as the cationic resin composition a composition comprising a blend of (I) a cationic, epoxy-based resin containing a diglycidylether of an aliphatic diol which diol is essentially free of ether oxygen atoms which epoxy-based resin has been advanced with a diphenol and (II) a different cationic epoxy-based resin, said blend containing from about 10 to about 90 percent of (I) and from about 90 to about 10 percent of (II) based on the total weight of cationic resin and having a charge density of from about 0.2 to about 0.6 milliequivalent of cationic charge per gram of resin.

4,883,573
REMOVAL OF ACID FROM CATHODIC ELECTROCOATING BATHS BY ELECTRODIALYSIS

Hartwig Voss, Frankenthal, and Thomas Bruecken, Dortmund, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Dec. 9, 1987, Ser. No. 130,570
Int. Cl.[4] B01D *13/02*
U.S. Cl. 204—182.4 6 Claims

1. A process for removing acid from a cathodic electrocoating bath in which an electroconductive substrate is coated with a cationic resin present in the form of an aqueous dispersion, by separation of the dispersion by ultrafiltration into a resin dispersion and an ultrafiltrate and further treatment of the ultrafiltrate comprising the steps of

passing the ultrafiltrate through the chambers K_1 of an electrodialysis cell Z_C comprising the characteristic sequence

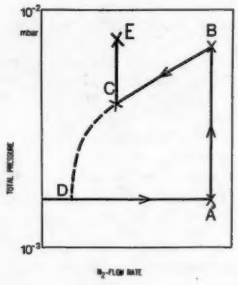
$$-(K_3-M_1-K_1-M_1-K_2-M_2)_n-,$$

where M_1 is an anion exchange membrane and M_2 is a cation exchange membrane, and passing an aqueous base through the chambers K_2 and water or an electrolyte, preferably the acid to be separated off, a salt of this acid or a mixture thereof, through the chambers K_3, and performing the electrodialysis using current densities of up to 100 mA/cm^2, the electric field required for this purpose being applied by means of two electrodes at the ends of the electrodialysis cell Z_C.

4,883,574
METHOD FOR APPLYING COATINGS TO OBJECTS BY MEANS OF MAGNETIC FIELD SUPPORTED REACTIVE CATHODE SPUTTERING

Carlos A. S. P. dos Santos Pereina Ribeiro, Albstadt, Fed. Rep. of Germany, assignor to hartec Gesellschaft fur Hartstoffe und Dunnschichttechnik mbH & Co. KG, Stetten an kalten Markt, Fed. Rep. of Germany

Filed Aug. 1, 1988, Ser. No. 226,731
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726731
Int. Cl.[4] C23C *14/34*
U.S. Cl. 204—192.15 14 Claims



1. Method for applying coatings to objects by means of magnetic field supported cathode sputtering in a vacuum, wherein in order to maintain the glow discharge necessary for the sputtering of the target material, the method includes the

steps wherein an inert gas is continuously fed into the coating chamber and, with the aid of a vacuum pump, is continuously pumped out of the coating chamber in such a way that a constant inert gas partial pressure is maintained in the coating chamber, and the step wherein at least one reactive gas is fed into the coating chamber, which forms a compound with the sputtered metallic target material, with which the workpieces are coated, characterized in that the total quantity of reactive gas continuously fed into the coating chamber is so chosen that the reactive gas component of the metal-reactive gas compound of the coating is in sub-stoichiometric relationship and there is no build up of reactive gas partial pressure, and that the step of feeding reactive gas into the coating chamber conducts the reactive gas flow directly into the space between the sputtering cathode and the workpieces to be coated, by-passing the sputtering cathode.

4,883,575

APPARATUS FOR CONTINUOUSLY PRODUCING A BASE FOR A PRINTED CIRCUIT BOARD

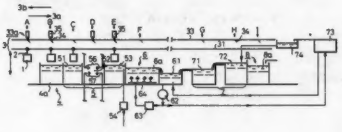
Hiroshi Yasuno; Fumio Sakatani, both of Ichihara, and Takeshi Kanda, Ayase, all of Japan, assignors to UBE Industries Ltd., Yamaguchi and Meiko Electronics Company, Ltd., Kanagawa, both of, Japan

Filed Jun. 2, 1988, Ser. No. 201,912

Claims priority, application Japan, Jun. 5, 1987, 62-141142

Int. Cl.[4] C25D *17/00*

U.S. Cl. 204—198 **22 Claims**



1. An apparatus for continuously producing a base for a printed circuit board comprising:

(A) a degreasing zone for degreasing at least one base for a printed circuit board, comprising at least one vessel containing a degreasing liquid;

(B) a water pre-washing zone for pre-washing said degreased base with water, comprising at least one water pre-washing vessel located downstream from the degreasing zone;

(C) an electrodeposition coating zone for treating said pre-washed base with an electrodepositing liquid, comprising at least one vessel containing the electrodepositing liquid and located downstream from the water pre-washing zone;

(D) a zone for recovering electrodepositing liquid remaining on said electrodeposition coated base, comprising at least one filtrate vessel connected to an ultrafiltration device and to the electrodeposition coating zone to form a closed channel and located downstream from the electrodeposition coating zone;

(E) a water post-washing zone for washing said base delivered from the recovering zone, comprising at least one water post-washing vessel located downstream from the recovering zone; and

(F) a transporting device for intermittently transporting said base successively through the degreasing, water pre-washing, electrodeposition coating, filtrate and water post-washing vessels, which transporting device is provided with means for conveying said base to a predetermined position above one of said vessels, stopping said base at said predetermined position, introducing said base into said one of said vessels, keeping said base in said vessel for a predetermined time and withdrawing said base from said vessel.

4,883,576

APPARATUS FOR SURVEY AND/OR TREATMENT OF A SMOOTH, CURVED SURFACE

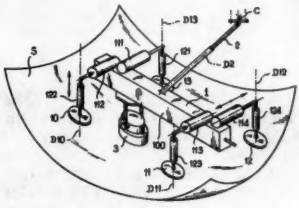
Antoine Gemma, Meudon, France, assignor to Electricite De France (Service National), Paris, France

Filed Nov. 30, 1987, Ser. No. 126,859

Claims priority, application France, Dec. 1, 1986, 86 16725

Int. Cl.[4] C25D *17/00;* **C25F** *7/00;* **B60T** *7/16;* **B60S** *9/02*

U.S. Cl. 204—224 M **18 Claims**



1. Apparatus for survey and/or treatment of a smooth curved surface, said apparatus comprising:

a vehicle able to be moved on said surface along a predetermined path,

a body of said vehicle,

means provided in said vehicle for abutment onto said surface, which means are movable with respect to said body of said vehicle,

a support arm for said vehicle and fixed thereto at one of its ends, said arm being at its other end rotatably pivotable in the vicinity of a centre of curvature of said curved surface, axes of said abutment means and of said support arm being able to be oriented substantially concurrent in the vicinity of said centre of curvature of said curved surface,

means for survey and/or treatment of said curved surface fixed to said vehicle,

means for control and driving of said vehicle and of said means for survey and/or treatment.

4,883,577

ELECTROPHORESIS DEVICE WITH SHARK-TOOTHED COMB HAVING A THICKNESS DETERMINED BY THE THICKNESS OF THE GEL

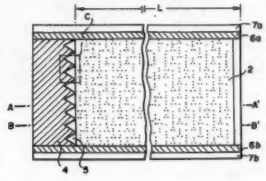
Naohiko Sugimoto, and Akira Fujita, both of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 28, 1988, Ser. No. 174,467

Claims priority, application Japan, Mar. 30, 1987, 62-76591; May 12, 1987, 62-114959

Int. Cl.[4] G01N *27/28*

U.S. Cl. 204—299 R **4 Claims**



1. An electrophoresis device, comprising:

a pair of electrically-insulated, flexible, water-impervious sheets disposed in an opposing relationship to one another;

spacers disposed between said sheets for separating said sheets, said spacers having a predetermined thickness;

gel membrane disposed between said sheets adapted to function as an electrophoresis medium;

a combo disposed adjacent an end of said gel membrane, said

comb having a plurality of saw-like protrusions abutting said end of said gel membrane so as to define a plurality of sample-pouring apertures, each of said apertures having a substantially triangular space formed by said end of said gel membrane and adjacent end faces of said saw-like protrusions, wherein the thickness of said shark's teeth comb d and the thickness of said gel membrane G satisfy the following equation:

$$G \times 1.1 < d < G + 50$$

in which the units are in micrometers.

4,883,578

ELECTRO-COATING APPARATUS AND METHOD

Frederick W. Jowitt; Robert H. Harrison, and Adrian C. Noke, all of Oxfordshire, United Kingdom, assignors to Metal Box plc, Reading, England

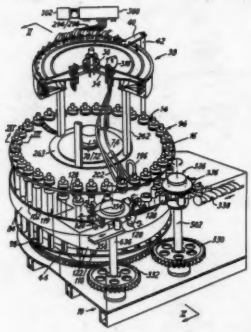
PCT No. PCT/GB87/00455, § 371 Date May 6, 1988, § 102(e) Date May 6, 1988, PCT Pub. No. WO88/00256, PCT Pub. Date Jan. 14, 1988

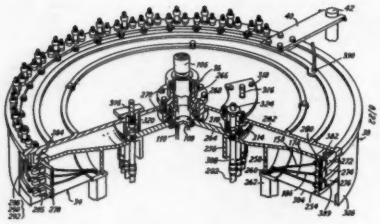
PCT Filed Jun. 26, 1987, Ser. No. 193,454

Claims priority, application United Kingdom, Jul. 7, 1986, 8616514

Int. Cl.[4] C25D *13/00*

U.S. Cl. 204—300 EC **26 Claims**





1. Electro-coating apparatus for electro-coating containers comprising:

(a) a rotatable turret;

(b) a plurality of electro-coating cells carried on said turret at positions spaced circumferentially at constant angular pitch, each cell incorporating at least one electro-coating electrode and being arranged to enclose a container in spaced relationship with said electrode and with an electro-coating fluid therebetween whereby a flow of electro-coating current between the electrode and an opposed surface of a container causes the electro-coating of the surface;

(c) a segmented slip-ring carried on said turret for rotation therewith, said slip-ring having successive segments connected electrically with the respective electrodes of successive cells;

(d) a plurality of stationary electrical brushes spaced around said segmented slip-ring and electrically contacting successive segments of said segmented slip-ring at corresponding positions on said segments;

(e) a plurality of switching means connected with the respective brushes for energizing said brushes with an electro-coating potential as required thereby to cause an electro-coating current to flow in the respective cells; and

(f) control means for causing operation of said switching means thereby to alternately energize and de-energize said brushes;

(g) said control means including (i) a control disc arranged for synchronous rotation with said turret; (ii) said control disc carrying a plurality of trigger devices at positions spaced circumferentially therearound; (iii) stationary sensing means being disposed adjacent said control disc and arranged to sense the passage thereby of successive trigger devices as said turret rotates and to provide in response to successive trigger devices successive output signals for controlling said switching means alternately in opposite senses thereby to successively energize and de-energize said brushes; and (iv) said trigger devices being positioned on said control disc so that each brush is energized with said potential only while it lies wholly in contact with a segment, and with each brush remaining energized for a predetermined constant angle of rotation of said turret, corresponding to a predetermined high proportion of the circumferential pitch of said segments, regardless of the speed of rotation of the turret.

4,883,579

PHOTORESPONSIVE REDOX DETECTION AND DISCRIMINATION

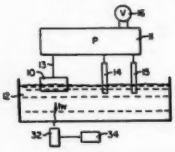
Gillian M. K. Humphries, Los Altos, Calif.; John W. Parce, Winston-Salem, N.C., and Harden M. McConnell, Stanford, Calif., assignors to Molecular Devices Corporation, Palo Alto, Calif.

Continuation of Ser. No. 604,800, Apr. 27, 1984, Pat. No. 4,704,353. This application Apr. 1, 1987, Ser. No. 34,036

The portion of the term of this patent subsequent to May 27, 2003, has been disclaimed.

Int. Cl.[4] G01N *33/50, 33/53*

U.S. Cl. 204—403 **2 Claims**



1. A photoresponsive device for making a plurality of determinations of a redox substance capable of modifying an electrical signal resulting from irradiation of a photoresponsive element, said device comprising:

a photoresponsive element having an irradiation receiving surface;

irradiation means for irradiating said surface;

a counterelectrode;

means for polarizing said element with respect to said counterelectrode; and

means for determining the photoresponse by maintaining a

fixed potential and light intensity and measuring the DC component of the photoresponse.

4,883,580

METHODS FOR DEACTIVATING IRON IN HYDROCARBON FLUIDS

Paul V. Roling, Spring, Tex., and Joseph H. Y. Niu, Wanaque, N.J., assignors to Betz Laboratories, Inc., Trevose, Pa.

Division of Ser. No. 201,655, Jun. 1, 1988, Pat. No. 4,847,415. This application Apr. 14, 1989, Ser. No. 338,018

Int. Cl.[4] C10G *29/20*

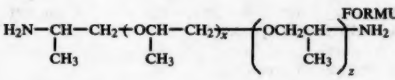
U.S. Cl. 208—48 AA **9 Claims**

1. A method of deactivating an iron species disposed in a hydrocarbon medium, wherein in the absence of said deactivating said metal would initiate decomposition of the hydrocarbon medium, said method comprising adding to said hydrocarbon medium an effective amount of a Mannich reaction product formed by reaction of reactants (A), (B), and (C); wherein (A) comprises an alkyl substituted phenol of the structure

FORMULA I

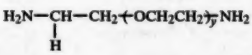
wherein R is selected from the alkyl, aryl, alkaryl, or arylalkyl of from about 1 to 20 carbon atoms; (B) comprises a polyoxyalkylenediamine selected from the group consisting of

FORMULA IIA



where the sum of x and z is from 1 to 6 and

FORMULA IIB



where y is from 1 to 6; and (C) comprises an aldehyde of the structure

FORMULA (III)

wherein R_1 is selected from H and an alkyl group having from about 1–6 carbon atoms wherein said iron species are deactivated.

4,883,581

PRETREATMENT FOR REDUCING OXIDATIVE REACTIVITY OF BASEOILS

Ghazi B. Dickakian, Houston, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Oct. 3, 1986, Ser. No. 914,994

Int. Cl.[4] C10G *9/16*

U.S. Cl. 208—48 R **26 Claims**

1. A method of producing lubricating oil baseoil having a reduced coking tendency comprising the steps of:

(a) subjecting said baseoil to conditions which accelerate formation of asphaltene coking precursors in said baseoil, said conditions comprising oxidizing said baseoil by sparging said baseoil with an oxidizing gas selected from the group consisting of air, oxygen; ozone, nitrogen oxides, sulfur oxides, and mixtures thereof; and

(b) removing asphaltene formed in step (a) from said baseoil by contacting said baseoil with a liquid antisolvent, said liquid antisolvent being miscible with said baseoil and having a higher insolubility for said asphaltene than said baseoil has for said asphaltene whereby said asphaltene is precipitated.

4,883,582

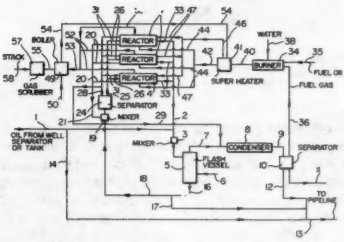
VIS-BREAKING HEAVY CRUDE OILS FOR PUMPABILITY

Malcolm T. McCants, 2400 Augusta, Suite 260, Houston, Tex. 77057

Filed Mar. 7, 1988, Ser. No. 164,861

Int. Cl.[4] C10G *65/12, 47/20*

U.S. Cl. 208—106 **6 Claims**



1. A method of reducing the viscosity of untreated crude oil, comprising the steps of:

(a) vis-breaking in a reactor a first portion of the untreated crude oil with a recycled stream to produce a partially cracked residuum of the untreated oil;

(b) mixing the partially cracked residuum of the untreated oil with a second portion of the untreated oil to quench cracking and producing a first mixture;

(c) separating gas, vapor, and liquid by flashing from said mixture;

(d) condensing the gas and vapor obtained in step (c) to produce liquid hydrocarbons and gas;

(e) splitting the liquid obtained in step (c) into first and second streams thereof;

(f) passing said first stream obtained in step (e) for use as said recycled stream in step (a);

(g) reacting coke produced in step (a) with superheated steam to produce a hydrogen-containing gas during regeneration cycle to the reactor; and

(h) mixing said hydrogen-containing gas with said first stream obtained in step (e) prior to vis-breaking in step (a).

4,883,583

PROCESS FOR THE CATALYTIC CRACKING OF HYDROCARBONS IN A FLUIDIZED BED AND THEIR APPLICATIONS

Jean-Louis Maulëon, Marly-le-Roy, and Jean-Bernard Sigaud, Vaucresson, both of France, assignors to Compagnie de Raffinage et de Distribution Total France, Paris, France

Continuation of Ser. No. 885,911, Jul. 15, 1986, abandoned. This application Aug. 8, 1988, Ser. No. 229,810

Claims priority, application France, Jul. 16, 1985, 85 10891

Int. Cl.[4] C10G *35/04*

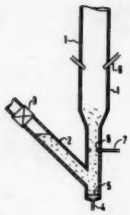
U.S. Cl. 208—113 **10 Claims**

1. A process for the catalytic cracking of a heavy hydrocarbon feedstock into lighter weight products in a fluidized bed, comprising the steps of:

injecting from an upstream position active catalyst particles in a fluidizing gas as a fully fluidized suspension, the fluid-

izing gas comprising hydrocarbons having five or fewer carbon atoms or mixtures thereof, the resulting dilute phase suspension having a density of from 15 to 700 kg/m^3 at a temperature above 550° C., into an elongate reaction zone, so that the fully fluidized catalyst suspension flows axially downstream through the reaction zone at a velocity of from 0.01 to 10 meters/second; and

injecting the feedstock to be cracked as jets of atomized droplets less than 200 microns in diameter and at a temperature of from 70° to 400° C. into the elongate reaction zone at a velocity of from 10 to 600 meters/second, said



jets originating from a plurality of positions spaced around the periphery of the reaction zone and downstream of the position of injection of said active catalyst, said jets of atomized feedstock being angled upstream at from 5 to 80 degrees relative to the axis of the reaction zone, so that the jets of atomized feedstock droplets enter the reaction zone in an upstream direction countercurrently to downstream flow of a fully established dilute phase fluidized suspension of active catalyst particles, wherein the atomized feedstock droplets are vaporized with the matter comprising the droplets being ultimately discharged downstream from said reaction zone.

4,883,584

PROCESS OF SEPARATING SPECIAL STEEL COMPONENTS FROM LUMP SHREDDER SCRAP

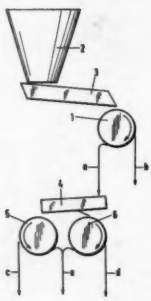
Hans-Peter Sattler, Bad Homburg, and Bernd Nichtweiss, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Metallgesellschaft AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 27, 1987, Ser. No. 114,167

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1986, 3639014

Int. Cl.^{4} B03C *1/30*

U.S. Cl. 209—38 **4 Claims**



1. In a process of separating special steel components from a fraction of shredder scrap from a shredding step, which fraction remains after the ferromagnetic content has been removed, the improvement comprising: dividing the fraction of shredder scrap into a normal size sub-fraction and an undersize sub-fraction, removing the normal size sub-fraction from the process and subjecting same to a separate processing, and separating from the undersize sub-fraction the special steel, the structure of which has been partly transformed from austenite into martensite during the shredding, by means of a magnetic drum having a field strength above 0.2 tesla.

4,883,585

ORE FLOTATION AND SULFENYL DITHIOCARBAMATES AS AGENTS FOR USE THEREIN

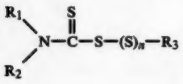
Clarence R. Bresson, and Rector P. Louthan, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 27, 1988, Ser. No. 263,438

Int. Cl.^{4} B03D *1/02*

U.S. Cl. 209—166 **25 Claims**

1. In a process for the recovery of minerals from an ore or concentrate containing the minerals wherein the ore or concentrate in the form of an aqueous pulp is subjected to froth flotation and the minerals are selectively recovered in the froth, and wherein a mineral flotation agent is employed in the aqueous pulp in an amount sufficient to control the type of minerals in the froth, the improvement comprising employing as said mineral flotation agent at least one sulfenyl dithiocarbamate defined by the formula:



wherein:

R_1 and R_2 are each selected from the group consisting of hydrogen and hydrocarbyl groups with not more than one of R_1 and R_2 being hydrogen;

n is 1 or 2; and

R_3 is a hydrocarbyl group.

4,883,586

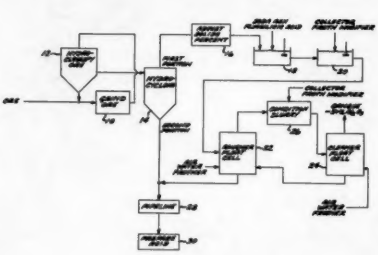
PROCESS FOR BENEFICIATING ORES CONTAINING FINE PARTICLES

Laurence W. Bierman; Samuel M. Polinsky, and Roger B. Humberger, all of Pocatello, Id., assignors to J. R. Simplot Co., Pocatello, Id.

Filed Jun. 16, 1988, Ser. No. 208,170

Int. Cl.^{4} B03D *1/02*

U.S. Cl. 209—167 **12 Claims**



1. A process for beneficiating a phosphate-containing ore wherein the phosphates are present in both coarse and fine particles mixed with gangue, comprising the steps of:

separating the phosphate-containing ore into two portions, a first portion consisting essentially of an aqueous slurry of fine gangue particles and fine value particles containing

phosphate values, at least about 75 percent of the particles in said first portion having a size of less than about 26 micrometers, the fine value particles having a size of less than about 20 micrometers, and a second portion comprising an aqueous slurry of coarse particles having a size greater than about 20 micrometers containing phosphate values;

conditioning the first portion by adding a flotation collector to the first portion that renders the gangue particles hydrophobic and adjusting the solids content of the first portion to less than about 15 percent by weight of solids if the solids content is greater than about 15 percent; and

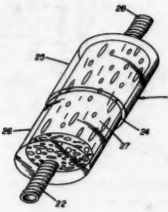
subjecting the conditioned, less than about 15% solids first portion to froth flotation to separate a gangue concentrated fraction and a fine value particle fraction containing enriched phosphate values, but without mechanically agitating the fine value particles containing phosphate values other than by action of the flotation bubbles.

4,883,587

POLYURETHANE IODINE SPONGE SWIMMING POOL FILTER

Harry H. LeVeen, 321 Confederate Cir.; Eric G. LeVeen, 19 Palmetto Rd., both of Charleston, S.C. 29407, and Robert F. Leveen, 312 Lombard St., Philadelphia, Pa. 19147

Filed Oct. 13, 1988, Ser. No. 257,215
Int. Cl.[4] C02F *1/76*
U.S. Cl. 210—94 **8 Claims**



1. A flowing water sterilization filter apparatus for the treatment of large quantities of water comprising a sectional housing, the housing sections being adapted to be sealingly mounted to each other to form a chamber, one of said sections being connected to inlet means and the other section being connected to outlet means, said inlet means and outlet means communicating with said chamber and a polyurethane open cell sponge loaded with iodine mounted in said housing chamber between said inlet means and outlet means, said sponge forming means for allowing water to pass therethrough and being treated to release iodine rangine from 1 to 5 parts per million of water into water as it passes through said housing.

4,883,588

UNDERWATER FILTER SYSTEM

Stephen W. Primavera, North Attleboro; John J. Burbank, Jr., Marlboro, and Garrett J. Neault, Carver, all of Mass., assignors to Vacco Industries, South El Monte, Calif.

Filed May 29, 1987, Ser. No. 55,536
Int. Cl.[4] B01D *27/08*
U.S. Cl. 210—117 **15 Claims**

1. A submersible filter system for immersion in a pool, said system, comprising:

a frame means;

a fluid coupling means affixed to said frame means in an upstanding position, said coupling means comprising the downstream end of a conduit for conducting an effluent fluid under pressure to said coupling means;

a hollow cannister having a bottom nipple means for releasably connecting said nipple means to said coupling means to establish fluid communication therebetween and to fixedly support said cannister in an upright position on said coupling means of said frame means;

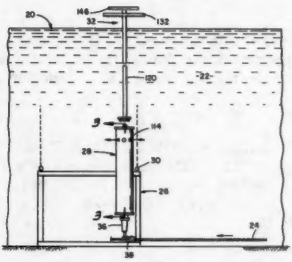
said cannister having a first fluid passage means in alignment with said nipple means for inducting the effluent fluid from said nipple means into said hollow cannister;

a filter means;

mounting means for fixedly mounting said filter means within and in spaced apart relation to said cannister,

said mounting means and said filter means being adapted to divide the interior of said cannister into an inlet chamber and a filtrate chamber;

said cannister having a second fluid passage means for exhausting filtrate fluid directly from said filtrate chamber into the pool;



a check valve means mounted in operative association with said first fluid passage means, said check valve means being responsive to the presence or absence of effluent fluid under pressure in the conduit for admitting effluent fluid into said inlet chamber and for preventing backflow of effluent fluid from said inlet chamber to said nipple means,

whereby when said cannister and said nipple means are uncoupled from said coupling means in the absence of effluent fluid under pressure in the conduit, effluent fluid is confined within said inlet chamber; and

an elongate tool means having cooperating means and adapted at one end for releasable interconnection at a top of said cannister to effect uncoupling of said cannister and nipple means from said coupling means when said tool means is operated at its other end.

4,883,589

SYSTEM FOR REMOVING CONTAMINANTS FROM GROUND WATER

Walter Konon, Waccabuc, N.Y., assignor to New Jersey Institute of Technology, N.J.

Filed May 17, 1988, Ser. No. 194,801
Int. Cl.[4] B01D *35/02*
U.S. Cl. 210—140 **28 Claims**

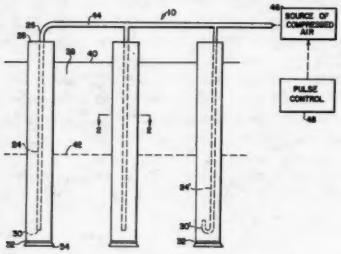
1. Apparatus for removing contaminants from ground water, comprising:

a tubular member made of a liquid pervious material, said tubular member having an upper end and a closed lower end, and said tubular member inserted in ground containing contaminated water with the ground in surrounding contact therewith;

supply conduit means for supplying a pressurized fluid to the lower end of said tubular member, said conduit means being positioned in said tubular member and having a lower, open end spaced above and adjacent to said lower end of said tubular member with a continuous gap pro-

vided between said conduit means and said tubular member which extends from the lower, open end of the conduit means to the upper end of the tubular member to permit the pressurized fluid to travel therein; and

a contaminant-removing material in said tubular member.



4,883,590

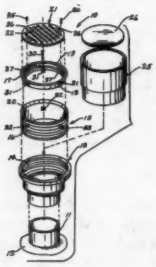
ADJUSTABLE FLOOR DRAIN APPARATUS

David J. Papp, 3578A S. 14th St., Milwaukee, Wis. 53221

Filed Oct. 20, 1988, Ser. No. 260,043

Int. Cl.[4] E03C *1/26*

U.S. Cl. 210—164 **5 Claims**



1. An adjustable floor drain apparatus comprising:

an outer cylindrically shaped body having an interior portion having threads disposed on the inside thereof, and having a predetermined inner diameter;

means for attaching said outer body to a top portion of a drain pipe having an outer diameter smaller than said predetermined inner diameter of outer body;

means for forming a seal between the top of said pipe and the bottom of said outer body;

a stepped shoulder removable cylindrical member having an enlarged upper outer diameter and a reduced dimension lower outer diameter wherein the lower outer diameter is smaller than the diameter of said inner portion of said outer body whereby at least the lower outer diameter of said cylindrical member is slideable relative to the inside of said outer body so that concrete poured around said cylindrical member will not come into contact with a substantial portion of the threads on the outer body and whereby said cylindrical member is removable from said outer body after the concrete has cured;

an inner cylindrically shaped body having thread means on the exterior thereof for mating with the inside thread means on said outer body whereby said inner body is threadable into said outer body in a space vacated by said cylindrical member;

ring means adapted to engage the top of said inner body, said ring means having a partially spherical surface around the lower outer periphery thereof and the top of said inner body having a complementary shaped partial spherical surface thereon for providing a mating slidable joint between said ring means and said inner body;

means for adjustably attaching said ring means to said inner body;

a grate having openings therethrough; and

recess means for receivably holding said grate on top of said ring means.

4,883,591

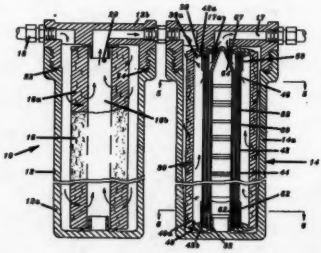
MULTI-PASS FLUID TREATING DEVICE

David Belasco, 10702 Rhonda Ave., Garden Grove, Calif. 92643

Continuation-in-part of Ser. No. 878,572, Jun. 25, 1986, abandoned, and Ser. No. 81,618, Jul. 31, 1987, abandoned, which is a continuation of Ser. No. 804,297, Dec. 3, 1985, abandoned, which is a continuation-in-part of Ser. No. 783,411, Oct. 3, 1985, Pat. No. 4,731,186. This application Sep. 11, 1987, Ser. No. 96,131

Int. Cl.[4] C02F *1/48*; B01D *35/06*

U.S. Cl. 210—223 **13 Claims**



1. A device for conditioning a fluid, comprising

container means having an inlet and an outlet so that fluid enters the container means through the inlet and exits the container through the outlet,

a plurality of magnets aligned in a row and contained within the container means between the inlet and the outlet, said magnets providing a magnetic field which surrounds the magnets, and

flow control means including a plurality of passageways proximate the magnets and generally parallel thereto and means for directing the flow of fluid serially through the passageways so that said fluid makes a plurality of passes by the row of magnets prior to exiting the outlet.

4,883,592

FILTER PRESS

Tetsuya Kurita, Takarazuka; Atsushi Takashima, Kobe, and Katsutami Shibasaki, Osaka, all of Japan, assignors to Kurita Machinery Manufacturing Co., Ltd., Osaka, Japan

Filed Aug. 28, 1987, Ser. No. 90,668

Claims priority, application Japan, Sep. 3, 1986, 61-208390; Sep. 6, 1986, 61-210007; Sep. 25, 1986, 61-227536; Sep. 25, 1986, 61-227537; Dec. 9, 1986, 61-293691; Feb. 14, 1987, 62-31908; Apr. 4, 1987, 62-83344

Int. Cl.[4] B01D *25/12*

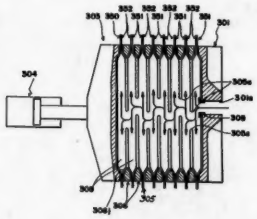
U.S. Cl. 210—227 **7 Claims**

1. A filter press comprising:

a front stand and a rear stand in spaced opposed relation to each other;

a plurality of filter plates positioned between said strands, each of said filter plates consisting essentially of a filter frame in the shape of a closed geometric figure defining a space therewithin;

a pair of abutting filter cloths between each two adjacent filter plates with the filter plates in abutting relation and holding said filter cloths therebetween when said press is in filtering operating condition and defining a raw liquid chamber therebetween and defining within each filter frame a filtrate chamber;



means for feeling a raw liquid to be filtered to said raw liquid chamber;

means for leading filtrate out of said filtrate chambers; and

a movable plate on said rear stand for pressing against and releasing pressure on said plurality of filter plates.

4,883,593

ULTRATHIN-SKINNED ASYMMETRIC MEMBRANES BY IMMISCIBLE SOLVENTS TREATMENT

Dwayne T. Friesen, and Walter C. Babcock, both of Bend, Oreg., assignors to Bend Research, Inc., Bend, Oreg.

Filed Oct. 27, 1988, Ser. No. 263,368

Int. Cl.[4] B01L *13/00*

U.S. Cl. 210—500.32 **9 Claims**

1. A process of making an asymmetric fluid separation membrane having an ultrathin dense layer on at least one surface thereof, comprising:

(a) substantially filling the pores of an asymmetric cellulosic semipermeable membrane having a finely porous layer on at least one surface thereof with a water immiscible organic liquid; and, while the pores of said membrane are still substantially filled with said water immiscible organic liquid,

(b) contacting said finely porous layer of said cellulosic semipermeable membrane with water.

9. The asymmetric fluid separation membrane prepared by the process of claim 1, 2, 3, 4, 5, 6, 7 or 8.

4,883,594

FLOODED BIOLOGICAL FILM REACTOR FOR WATER TREATMENT, WITH GAS CHARGING VIA A MEMBRANE

Ivan Sekoulov, Muellenhoffweg 22, DE-2000 Hamburg 52, and Hans-Juergen Braeutigam, Marmstorfer Weg 74, D-2100 Hamburg 90, both of Fed. Rep. of Germany

PCT No. PCT/EP86/00419, § 371 Date May 4, 1987, § 102(e) Date May 4, 1987, PCT Pub. No. WO87/00517, PCT Pub. Date Jan. 29, 1987

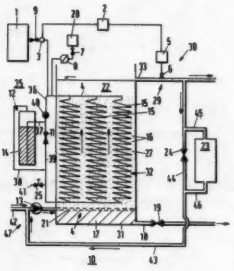
PCT Filed Jul. 17, 1986, Ser. No. 26,693

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1985, 3525493; Dec. 14, 1985, 3544383

Int. Cl.[4] C02F *3/06*

U.S. Cl. 210—603 **3 Claims**

1. Process for elimination of undesired water components from water by means of flooded biofilm reactors having a reactor bed with reactor support material, wherein water is supplied into the reactor via a distribution system and a gas is constantly admitted to the reactor support material over the full height of the whole reactor bed, wherein the admitted gas is a gas required by a biofilm on the reactor support material, is admitted to the reactor support material and released metabolic end products are withdrawn from the reactor support material by means of a first substance exchanger formed of a liquid impermeable synthetic material that is reinforced by a textile and surrounded by the reactor support material, wherein water is withdrawn from the biofilm reactor for recirculation and a gas from the group consisting of oxygen, hydro-



gen and carbon dioxide is supplied to the recirculation water through a second substance exchanger formed of a textile reinforced nonporous synthetic material and the recirculation water then returned to the biofilm reactor, and wherein undesired gas and volatile components are separated and removed from the reactor and passed through an absorber unit.

4,883,595

METHOD FOR THE EXTRACTION OF A SUBSTANCE FROM AN AQUEOUS SOLUTION

Reijo O. Seppänen, Äetsä , Finland, assignor to Oy Nokia AB, Helsinki, Finland

Filed May 27, 1988, Ser. No. 199,557

Claims priority, application Finland, May 28, 1987, 872389; Oct. 8, 1987, 874438

Int. Cl.[4] B01D *11/04*

U.S. Cl. 210—634 **4 Claims**

1. A method for separating a substance from an aqueous solution and possibly concentrating it at the same time comprising the steps of extracting said substance from the aqueous solution into an organic volatile extractant, and thereafter evaporating said extractant in direct contact with the aqueous phase into which said substance is desired to be transferred.

4,883,596

CARBONACEOUS ADSORBENT FOR REMOVAL OF PYROGEN AND METHOD OF PRODUCING PURE WATER USING SAME

Wataru Agui, Tokyo; Shuji Tamura, Ohmiya; Hiroshi Kuyama, Urawa; Yoshiya Kurachi, Tokyo; Masahiko Abe, Noda; Yukihiro Kaneko, Funabashi, and Keizo Ogino, Tokyo, all of Japan, assignors to Tokyo Organic Chemical Industries, Ltd., Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,239

Claims priority, application Japan, Mar. 31, 1987, 62-76093; Mar. 31, 1987, 62-76094

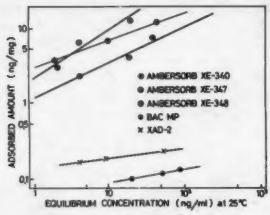
Int. Cl.[4] C02F *1/28, 9/00*

U.S. Cl. 210—638 **6 Claims**

1. A method for the removal of pyrogenic matter dissolved in water, comprising:

contacting the water containing pyrogenic matter with a

carbonaceous adsorbent prepared by carbonizing porous beads of a cross-linked polymer, wherein the cross-linked



porous beads retain their skeletal structure intact through the carbonization treatment.

4,883,597

HYDROPHOBIC MEMBRANE FOR DRYING GEL MATRICES

Daniel Perlman, Arlington, Mass., assignor to Brandeis University, Waltham, Mass.

Filed Oct. 28, 1988, Ser. No. 264,097
Int. Cl.[4] B01D *13/00*
U.S. Cl. 210—640 **16 Claims**

1. A method for removing liquid from an electrophoresis gel matrix comprising the steps of:

providing a water vapor-permeable membrane adapted to transmit water vapor and to resist passage of liquid water by capillary diffusion, said membranes being hydrophobic,

contacting said gel matrix with said membrane, and

subjecting said gel matrix and membrane to a vacuum to remove water vapor from said matrix through said membrane, whereby liquid is removed from said matrix and said matrix adheres to said membrane.

4,883,598

PROCESS FOR ISOLATING COAGULATION FACTORS, AND ADSORBENT MATERIAL SUITABLE THEREFOR

Waander Riethorst, Walkottelanden 92, 7542 MV Enschede; Bondewyn W. König, Maarssenbroeck; Willem G. van Aken, Amstelveen; Adriaan Bantjes, Enschede; Tom Beugeling, Enschede, and Marcelinus P. W. M. Te Booy, Amsterdam, all of Netherlands, assignors to Waander Riethorst, Netherlands

Filed Aug. 3, 1988, Ser. No. 227,681
Claims priority, application Netherlands, Aug. 14, 1987, 8701915
Int. Cl.[4] B01D *15/08*
U.S. Cl. 210—656 **20 Claims**

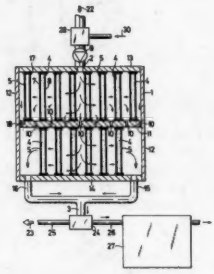
1. A process for isolating coagulation factors from a starting material by means of liquid chromatography, comprising the step of adsorbing said coagulation factors on an adsorbent material comprising a polymeric carrier material to which ligands selected from the group consisting of primary, secondary, tertiary and quarternary amino groups, are linked via spacers, said spacers having a chain length of at least 6 atoms and containing within said chain at least one link having hydrophilic properties and wherein the ligand density is greater than 30 umoles/ml of swollen matrix.

4,883,599

METHOD FOR CLEANSING METAL-CONTAINING SOLUTIONS

Erik Lindahl, Appelboms väg 14, S-186 00 Vallentuna, and Gunnar Hovsenius, Tunavägen 32, S-194 51 Upplands Väsby, both of Sweden

PCT No. PCT/SE87/00454, § 371 Date Jun. 6, 1988, § 102(e) Date Jun. 6, 1988, PCT Pub. No. WO88/02738, PCT Pub. Date Apr. 21, 1988
PCT Filed Oct. 8, 1987, Ser. No. 204,176
Claims priority, application Sweden, Oct. 16, 1986, 8604404
Int. Cl.[4] C02F *1/42*
U.S. Cl. 210—670 **6 Claims**



1. A method for cleansing metal-containing solutions, which comprise a fluid solution selected from the group consisting of water containing contaminates from contaminated flue gases and contaminated process water, said fluid solution containing at least one of the metals from the group consisting of mercury, cadmium, zinc and lead, the metals being present in water-soluble form, the method comprising: passing said solution through an ion-exchange material (4) which consists essentially of sulfhydrated cellulose, said metals being absorbed in the sulfhydrated cellulose; regenerating the ion-exchange material (4) subsequent to the absorption of a predetermined quantity of metal, by rinsing the ion-exchange material with an aqueous solution that contains hydrochloric acid at a concentration of at least about 1 molar HC1 and precipitating the metals in sulphide form from the liquid that is eluted from the ion-exchange material in said rinsing process.

4,883,600

STABILIZATION OF SOLUBLE MANGANESE IN AQUEOUS SYSTEMS

James R. MacDonald, Chicago, and Barbara E. Fair, Downers Grove, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Oct. 12, 1988, Ser. No. 256,541
Int. Cl.[4] C02F *5/12*
U.S. Cl. 210—696 **7 Claims**

1. A method of stabilizing soluble manganese by the reduction of manganese deposits or precipitates formed in situ in the waters of aqueous systems in the presence of an effective amount of halogen species to control microbiological growth in said aqueous systems comprising:

adding to said waters an effective amount of a water-soluble, nitrogen containing composition, said composition having the general chemical structure of Formula I:

Formula I

and is further defined as:

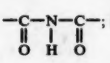
(a) sulfamic acid and the water-soluble alkali metal, ammo-

nia, and amine salts thereof, wherein one of X and Y is hydrogen, the other being $-SO_3^-$;

(b) water-soluble nonaromatic primary amines, wherein one of X and Y is hydrogen, the other being a hydrocarbon radical;

(c) water-soluble nonaromatic secondary amines, wherein each of X and Y is a hydrocarbon radical; and

(d) water-soluble amides which include the moiety of Formula II wherein both X and Y have carbonyl radicals:



Formula II

mixtures thereof.

4,883,601

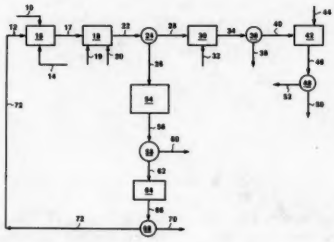
PROCESS FOR PURIFYING AN AQUEOUS, HYDROGEN SULFIDE-SCRUBBING SOLUTION

Jeffery W. Koepke, Orange, and Dennis D. Delaney, Yorba Linda, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Aug. 30, 1988, Ser. No. 238,752

Int. Cl.[4] C01G *31/00*; C02F *1/72*

U.S. Cl. 210—710 **40 Claims**



1. A process for purifying an aqueous hydrogen sulfide-scrubbing solution containing a water-soluble vanadium component and a water-soluble organic compound, said scrubbing solution being capable of absorbing hydrogen sulfide and converting the hydrogen sulfide into elemental sulfur, which process comprises:

(a) forming a slurry by mixing said scrubbing solution with (1) particles of a spent solid catalyst containing molybdenum and aluminum and (2) a basic aqueous solution;

(b) contacting said slurry with an oxygen-containing gas under conditions such that the molybdenum in said catalyst is dissolved and oxidized to molybdate while said aluminum remains substantially in the form of a solid residue;

(c) separating said aqueous solution formed in step (b) from said solid residue;

(d) contacting said aqueous solution with hydrogen sulfide under conditions such that the molybdenum in said solution is precipitated, thereby forming an aqueous solution having a reduced concentration of molybdenum;

(e) contacting said aqueous solution having a reduced concentration of molybdenum with a base under conditions such that the vanadium in said solution is precipitated, thereby forming an aqueous solution having a reduced concentration of vanadium and molybdenum; and

(f) recovering said aqueous solution having a reduced concentration of vanadium and molybdenum as wastewater which also has a reduced concentration with respect to said slurry formed in step (a) of said water-soluble organic compound originally present in said hydrogen sulfide-scrubbing solution.

4,883,602

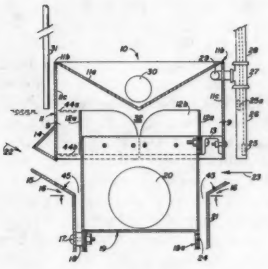
DECANTING APPARATUS AND METHOD

Marvin H. Anderson, Denver, Colo., assignor to Fluid Dynamics, Inc., Boulder, Colo.

Filed Aug. 22, 1988, Ser. No. 235,010

Int. Cl.[4] C02F *1/20*

U.S. Cl. 210—776 **20 Claims**



1. A method of decanting liquid from a tank receiving liquid and solids for settling out of the solids from the liquid, comprising:

fixing a trough having an open top in the tank and surrounding the open top with a weir;

covering the open top with an air tight hood having a lower edge extending outwardly of and below the open top of the trough;

supplying liquid into the tank up to a level above the open top of the trough;

controlling both the supply and the discharge of air to the interior of the hood by vent control means for maintaining the level of liquid in the hood to be just above the open top of the trough for permitting liquid to flow over the open top of the weir into the trough; and

discharging liquid into a liquid trap into an effluent outlet connected to the trough at a level below the lower edge of the hood to prevent siphoning through said effluent outlet.

4,883,603

METHOD FOR SEPARATING COARSE GRAINED AND AGGLOMERATE PIGMENT PARTICLES FROM A SUSPENSION

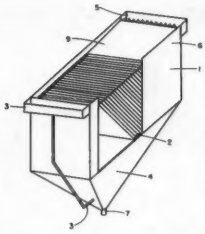
Walter Roggenstein, Freiburg, and Paul Rustemeyer, Gundelfingen, both of Fed. Rep. of Germany, assignors to Rhodia AG, Breisgau, Fed. Rep. of Germany

Filed Jul. 18, 1988, Ser. No. 220,567

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1987, 3734881

Int. Cl.[4] B01D *21/02*

U.S. Cl. 210—802 **1 Claim**



1. A method of separating coarse grained and agglomerated

pigment particles from a suspension containing coarse grained, agglomerated and fine grained particles by sedimentation by gravity and removing a suspension containing primarily fine grained pigment particles which consists of introducing said suspension into an apparatus comprising a vessel (1), said vessel having an inflow device (3) for introducing said suspension into the vessel, the vessel being funnel shaped at the bottom (4), said inflow device leading into said funnel shaped bottom, a plurality of stationery angled plates (2) within the vessel disposed parallel to each other and at an angle of $<90°$ from the horizontal, said inflow device being located below said angled plates, an upper drain or overflow device (5) in the upper part of said vessel for discharging a suspension containing mainly finely grained pigment particles from the vessel, a lower drain (7) in the lower part of the vessel for discharging the suspension containing mainly coarse grained and agglomerated pigment particles from the vessel, a horizontal plate (9) in the upper part (6) of said vessel (1) covering the area of the upper part of the vessel (1) which is free of said angled plates (2), the horizontal plate (9) being located between the angled plate (2) which is the closest to said upper drain or overflow device (5) and said overflow device (5), said upper drain or overflow device being located on the same level as said horizontal plate (9), whereby short-circuit flow of the suspension from the lower part (4) of the vessel (1) is avoided, transferring a suspension containing primarily fine grained pigment particles to the upper drain or overflow device (5) and discharging said suspension containing primarily fine grained pigment particles therefrom.

4,883,604

SMOOTHING COMPOSITIONS FOR TEXTILE FIBERS CONTAINING DIALKYL ETHERS OF (POLY)ALKYLENE GLYCOLS

Rudolf Veitenhansl, Haan; Peter Waltenberger, Breitscheid-Hollig; Fritz Lange, Essen; Guenter Uphues, Monheim, and Uwe Ploog, Haan, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Feb. 23, 1988, Ser. No. 159,621

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1987, 3734931

Int. Cl.[4] D06M *13/02, 13/18, 13/46*

U.S. Cl. 252—8.9 **15 Claims**

1. A liquid composition for treating fibers to impart the property of slipperiness to the fibers consisting essentially of from about 5 to about 30% by weight of a smoothing agent containing an aliphatic polyether having the formula:

$$R^1—X—O—R^2$$

wherein R^1 and R^2 are selected from a hydroxy substituted or non-hydroxy substituted alkyl or alkenyl group having from 6 to 24 carbon atoms, each of R^1 and R^2 being the same or different, and X is a homopolymer of copolymer containing one or more C_2 to C_6 alkylene oxide groups having a degree of polymerization of 1 to 25, said composition being in the form of a solution, dispersion or emulsion in water or an organic solvent and oxidized, high-density polyethylene wherein the weight ratio of aliphatic polyether to said polyethylene is within the range of about 10:1 to about 1:4, respectively.

7. A process for smoothing textile fibers consisting essentially of contacting said fibers with the composition of claim 1, and drying said fibers, said composition being applied at a weight sufficient to lower the coefficient of friction of said fibers.

4,883,605

ZIRCONIUM CHELATES AND THEIR USE FOR CROSS-LINKING

Donald E. Putzig, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

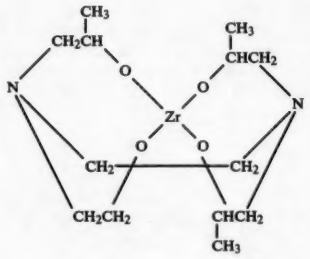
Division of Ser. No. 12,404, Feb. 9, 1987, Pat. No. 4,798,902.

This application Aug. 26, 1988, Ser. No. 236,784

Int. Cl.[4] E21B *43/26*

U.S. Cl. 252—8.551 **8 Claims**

1. In a process for selectively plugging permeable zones in subterranean formations or subterranean leaks wherein a cross-linked gel formed from a water soluable polysaccharide is injected into the permeable zone or the site of the subterranean leak, the improvement comprising effecting cross-linking of the gel with a zirconium diamine chelate represented by the formula:



4,883,606

WATER-SOLUBLE TEMPER ROLLING OIL AND METHOD OF TEMPER ROLLING

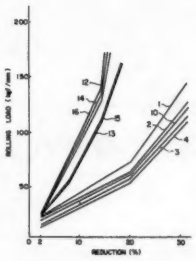
Hiroshi Kuwamoto, Fukuyama; Shuichi Iwado, Okayama; Yoichi Koga; Tomoya Izushi, both of Fukuyama; Toshimi Muto, Hiratsuka, and Nobuomi Kuroi, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha and Yushiro Chemical Industry Co., Ltd., both of Tokyo, Japan

Filed Oct. 7, 1987, Ser. No. 105,982

Claims priority, application Japan, Oct. 13, 1986, 61-241526

Int. Cl.[4] C10M *105/58, 105/74*

U.S. Cl. 252—32.5 **4 Claims**

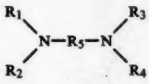


1. A temper rolling oil which comprises:

(A) a water-soluble cationic compound prepared by neutralizing a condensation product obtained by reacting the following compounds i to iii with each other by heating:

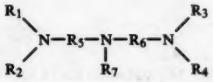
i. an aliphatic dicarboxylic acid having 6 to 22 carbon atoms,

ii. at least one amino compound selected from the group consisting of (a)–(c):



(a)

wherein R_1 to R_4 are each a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, provided that at least one of them is a hydrogen atom, and R_5 is an alkylene group having 1 to 4 carbon atoms,



(b)

wherein R_1 to R_4 and R_7 are each a hydrogen atom or an alkyl group having 1 to 3 carbon atoms, provided that at least one of them is a hydrogen atom, and R_5 and R_6 are each an alkylene group having 1 to 4 carbon atoms, and

(c)

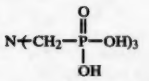
wherein n is an integer of 3 to 5; and

iii. a polyethyleneimine having an average molecular weight of 300 to 2,000, with at least one oxoacid of phosphorus selected from the group consisting of (d)–(f):

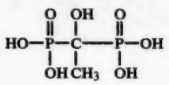
(d) phosphoric acid, phosphorous acid, hypophosphorous acid, and perphosphoric acid;

(e) a condensed product of an oxoacid of phosphorus selected from the group consisting of pyrophosphoric acid, trimetaphosphoric acid, tetrametaphosphoric acid, pyrophosphorous acid, polymetaphosphorous acid, and diperphosphoric acid; and

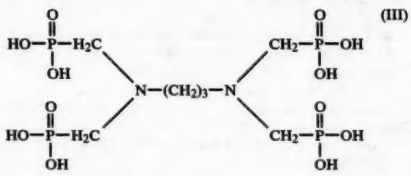
(f) a compound selected from the group consisting of (I)–(III):



(I)



(II)



(III)

(B) an aqueous rust preventing component, and

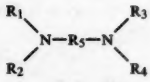
(C) water.

2. A method of temper rolling, comprising the steps of pickling a hot rolled steel sheet, subjecting the pickled steel sheet to cold rolling, annealing the resulting steel sheet, and rolling the annealed steel sheet with rollers, wherein said rolling of the annealed steel sheet is conducted at a reduction ranging from 0.5 to 30% using a diluted solution obtained by diluting a temper rolling oil which comprises:

(A) a water-soluble cationic compound prepared by neutralizing a condensed product obtained by reacting the following compounds i to iii with each other by heating:

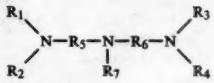
i. an aliphatic dicarboxylic acid having 6 to 22 carbon atoms,

ii. at least one amino compound selected from the group consisting of (a)–(c):



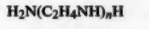
(a)

wherein R_1 to R_4 are all hydrogen atoms or alkyl groups having 1 to 3 carbon atoms, provided that at least one of them is a hydrogen atom, and R_5 is an alkylene group having 1 to 4 carbon atoms,



(b)

wherein R_1 to R_4 and R_7 are all hydrogen atoms or alkyl groups having 1 to 3 carbon atoms, provided that at least one of them is a hydrogen atom, and R_5 and R_6 are each an alkylene group having 1 to 4 carbon atoms, and



(c)

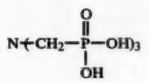
wherein n is an integer of 3 to 5, and

iii. a polyethyleneimine having an average molecular weight of 300 to 2,000, with at least one oxoacid of phosphorus selected from the group consisting of (d)–(f):

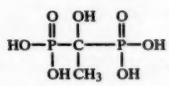
(d) phosphoric acid, phosphorous acid, hypophosphorous acid, and perphosphoric acid;

(e) a condensed product of an oxoacid of phosphorus selected from the group consisting of pyrophosphoric acid, trimetaphosphoric acid, tetrametaphosphoric acid, pyrophosphorous acid, polymetaphosphorous acid, and diperphosphoric acid; and

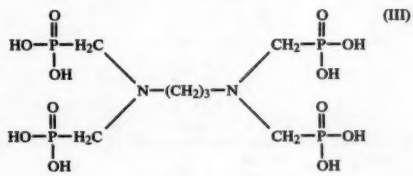
(f) a compound selected from the group consisting of (I)–(III):



(I)



(II)



(III)

(B) an aqueous rust preventing component, and

(C) water, so that the concentration of the water-soluble cationic compound contained therein is 300 to 5,000 ppm.

4,883,607

WATER-INSOLUBLE SILICATE CONTAINING DETERGENT BUILDER GRANULATE

Manfred Diehl, Frankfurt am Main, Fed. Rep. of Germany, assignor to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 25, 1988, Ser. No. 147,943

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1987, 3702763; Oct. 21, 1987, 3735618

Int. Cl.[4] C11D *7/02, 7/20*

U.S. Cl. 252—174.18 **4 Claims**

1. A granulated detergent builder consisting of:

70 to 80 weight percent of a water-insoluble silicate, capable of binding calcium, in the form a finely divided, bound-water-containing, synthetically produced, water-insoluble, crystalline compound of the general formula

$$(Kat)2/n^{O})x \cdot Me_2O_3 \cdot (SiO_2)_y \qquad (I),$$

in which Kat represents an n-valent cation which is exchangeable with calcium, x a number from 0.7 to 1.5, Me is boron or aluminum and y a number from 0.8 to 6,

2 to 3 weight percent of nonionic surfactant,

0 to 1 weight percent of alkali,

2.4 to 5 weight percent of carboxymethylcellulose and/or methylcellulose,

and the balance water.

4,883,608

POLYMERIC DECONTAMINATION COMPOSITION

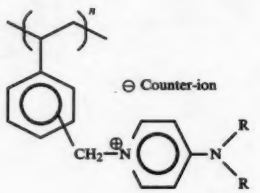
David A. Trujillo; William A. McMahon, Jr., and Robert E. Lyle, Jr., all of San Antonio, Tex., assignors to Southwest Research Institute, San Antonio, Tex.

Filed Nov. 18, 1987, Ser. No. 121,941

Int. Cl.[4] B23B *5/16*

U.S. Cl. 252—189 **10 Claims**

1. A polymeric chemical warfare agent decontamination composition comprising a polymeric quaternary pyridinium salt resulting from the reaction of a polyvinylbenzyl salt and a aminopyridine and having the general formula:



in which n is an integer of at least 10 and R is a C_1 to C_{20} or higher alkyl group.

4,883,609

PYRIMIDINE DERIVATIVES

Shuhei Yamada, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

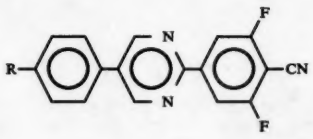
Filed Nov. 16, 1988, Ser. No. 271,795

Claims priority, application Japan, Nov. 17, 1987, 62-289690

Int. Cl.[4] G02F *1/13;* **C09K** *19/34;* **C07D** *239/00, 239/02*

U.S. Cl. 252—299.61 **9 Claims**

1. A pyrimidine derivative having general formula:



wherein, R is one of a straight chain alkyl group having from 1 to 12 carbon atoms and an alkoxy group having from 1 to 12 carbon

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4,883,610

SOIL RELEASE PROMOTING LIQUID DETERGENT COMPOSITION CONTAINING A PET-POET COPOLYMER AND NARROW RANGE ALCOHOL ETHOXYLATE

Loretta K. Ciallella, Hopelawn, N.J., assignor to Colgate-Palmolive Co., Piscataway, N.J.

Filed Oct. 27, 1987, Ser. No. 113,798

Int. Cl.[4] C11D *1/72, 3/37, 17/08;* **D06M** *15/507*

U.S. Cl. 252—559 **6 Claims**

1. A soil release promoting liquid detergent composition which comprises 12 to 20% of a narrow range ethoxylate nonionic detergent (NRE) which is a condensation product of a saturated higher fatty alcohol of 12 to 14 carbon atoms and an average of 6 to 8 moles of ethylene oxide per mole of such higher fatty alcohol, in polyethoxy ethanol groups, with at least 90% of the NRE being higher fatty alcohol ethoxylates of ethoxy contents in the range of 4 to 10 ethylene oxide groups per mole, 0.5 to 2% of a soil release promoting compound which is a copolymer of polyethylene terephthalate and polyoxyethylene terephthalate (PET-POET copolymer) which is of a weight average molecular weight in the range of 15,000 to 50,000 and in which the polyoxyethylene of the polyoxyethylene terephthalate of the PET-POET copolymer is of a molecular weight in the range of 1,000 to 10,000, and 60 to 80% of water, which liquid detergent composition is of improved soil release promoting characteristics vs. oily soils on polyester fabrics to be washed at low temperature with aqueous wash water solutions of the detergent composition, compared to identical compositions in which the nonionic detergent component is a broad range ethoxylate nonionic detergent (BRE) being employed in wash water at low temperature to wash identically soiled polyester fabrics.

4,883,611

DICHROIC COLORING AGENTS FOR LIQUID CRYSTAL DISPLAYS

Keisuke Takuma; Sizuo Kuroda; Tsukasa Oyama, and Hiroshi Aiga, all of Ohmutr., Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

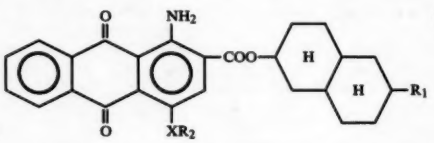
Filed Sep. 9, 1988, Ser. No. 242,289

Claims priority, application Japan, Sep. 16, 1987, 62-229825; Dec. 18, 1987, 62-318705

Int. Cl.[4] C09K *19/00;* **C07C** *101/80;* **C09B** *1/16, 1/60*

U.S. Cl. 552—235 **12 Claims**

1. Dichroic coloring agent for liquid crystal displays represented by the formula (I):



(I)

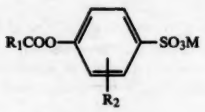
wherein X is S or NH; R_1 is a hydrogen atom, halogen atom, alkyl or alkoxy; and R_2 is a hydrogen atom, alkyl or aryl group.

4,883,612
PREPARATION OF PARA-ACYLOXYBENZENE SULFONATES

José Moyne, Caluire, and Camille Disdier, Lyons, both of France, assignors to Rhone-Poulenc Chimie de Base, Courbevoie, France

Continuation of Ser. No. 702,732, Feb. 19, 1985, abandoned. This application May 14, 1987, Ser. No. 51,226
Claims priority, application France, Feb. 17, 1984, 84 02399
Int. Cl.[4] C07C *143/46, 143/38*
U.S. Cl. 260—402 19 Claims

1. A process for the preparation of a paraacyloxybenzene sulfonate having the general formula (I):



wherein R_1 is a straight or branched chain aliphatic radical having from 6 to 11 carbon atoms, R_2 is hydrogen, halogen, an alkyl radical having from 1 to 4 carbon atoms, or the radical —SO_3M, and M is an alkali or alkaline earth metal, or ammonium, which process comprises acylating an alkali or alkaline earth metal, or ammonium p-phenol sulfonate, with an anhydride of a straight or branched chain carboxylic acid having from 7 to 12 carbon atoms, in a polar aprotic solvent and in the presence of a catalytically effective amount of an alkali or alkaline earth metal salt of a straight or branched chain aliphatic carboxylic acid having from 7 to 12 carbon atoms, the molar ratio of polar aprotic solvent to p-phenol sulfonate ranging from 5 to 50.

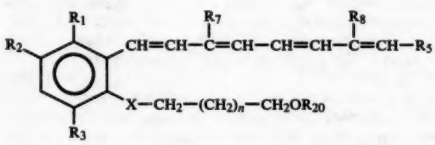
19. The process as defined by claim 1, said acid anhydride comprising pelargonic anhydride or 3,5,5-trimethylhexanoic anhydride.

4,883,613
PHENYL SUBSTITUTED-2,4,6,8-NONATETRAENOIC ACID

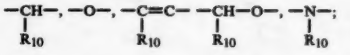
Edward R. Aig, Fair Lawn; John W. Coffey; Allen J. Lovey, both of West Caldwell, and Michael Rosenberger, Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 922,430, Oct. 23, 1986, Pat. No. 4,780,251, which is a division of Ser. No. 746,812, Jun. 20, 1985, Pat. No. 4,648,996, which is a continuation-in-part of Ser. No. 635,100, Jul. 27, 1984, abandoned. This application Jul. 31, 1987, Ser. No. 79,974
Int. Cl.[4] C09F *7/00*
U.S. Cl. 260—408 5 Claims

1. A compound selected from the groups of phenyl derivatives of the formula:



wherein n is an integer of from 6 to 7; R_1 is hydrogen, lower-alkyl, trifluoromethyl, chlorine or fluorine R_2 is trifluoromethyl, hydrogen, hydroxy, loweralkyl, alkoxy, trifluoromethylloweralkoxy, chlorine or fluorine; R_3 is hydrogen, lower alkyl, chlorine or fluorine, X is

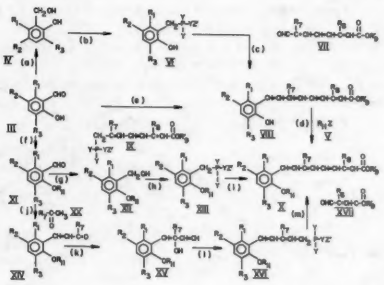


R_7, R_8, R_9 and R_{10} are individually hydrogen or lower alkyl; and R_{20} is hydrogen or taken together with its attached oxygen atom forms a hydrolizable ether group and R_5 is —$COOR_9$;
and pharmaceutically acceptable salts thereof.

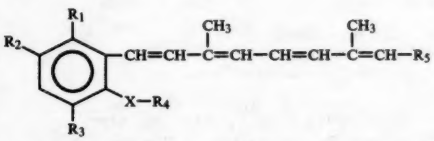
4,883,614
PHENYL SUBSTITUTED-2,4,6,8-NONATETRAENOIC ACID

Edward R. Aig, Fair Lawn; John W. Coffey; Allen J. Lovey, both of West Caldwell, and Michael Rosenberger, Caldwell, all of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 635,100, Jul. 27, 1984. This application Oct. 24, 1986, Ser. No. 922,621
Int. Cl.[4] C11C *1/00*
U.S. Cl. 260—413 23 Claims



1. A compound selected from the group of phenyl derivatives of the formula:



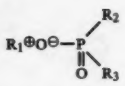
wherein R_1 is hydrogen, lower alkyl, chlorine, fluorine or trifluoromethyl; R_2 is chlorine, trifluoromethyl, lower alkyl, fluorine, hydroxy, loweralkoxy, trifluoromethylloweralkoxy, or hydrogen; R_3 is hydrogen, lower alkyl, chlorine, or fluorine; R_4 is an alkyl group having a straight chain length of 4 to 9 carbon atoms; X is —O—; R_5 is $COOR_9$; and R_9 is hydrogen or lower alkyl; and pharmaceutically acceptable salts thereof.

4,883,615
FLAMEPROOFING COMPOUNDS

Tibor Robinson, Basel, and Rainer Wolf, Allschwil, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Filed Jul. 14, 1986, Ser. No. 884,853
Claims priority, application Fed. Rep. of Germany, Jul. 18, 1985, 3525659; Jul. 18, 1985, 3525660
Int. Cl.[4] C07F *9/00*
U.S. Cl. 428—423.1 9 Claims

1. A process for flameproofing a substrate comprising applying to the substrate a compound of formula I



(I)

in which $R_1\oplus$ is an $N\oplus$ cation derived from protonation of

(A) the water-soluble reaction product of an alkylene diamine or polyalkylene polyamine with cyanamide, dicyanodiamide, guanidine or bisguanidine or with a mixture of at least 50 mole % of cyanamide, dicyanodiamide, guanidine or biguanidine and up to 50 mole % of a dicarboxylic acid or a mono- or di-ester of a dicarboxylic acid, optionally in the presence of a catalyst selected from metals, metal salts and heterocyclic nitrogen-containing organic bases; said Product A containing reactive hydrogen atoms bound to nitrogen; or

(B) the water-soluble reaction product of Product A with epichlorohydrin or a precursor thereof,

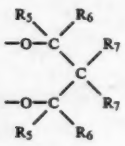
(C) the water-soluble reaction product of Product A with formaldehyde or a formaldehyde precursor, or

(D) the water-soluble reaction product of Product A, B or C with a N-methylol derivative of a urea, melamine, guanamine, triazinone, urone, carbamate or acid amide optionally in the presence of a catalyst for the crosslinking of N-methylol compounds listed above;

R_2 is —OH; $—OC_{1\text{-}12}$alkyl; —O—phenyl; $—O\ominus NH_4\oplus$; or $—O^-R_1\ominus$ where $R_1\ominus$ is as defined above;

R_3 is $C_{1\text{-}12}$alkyl or phenyl or has a significance of R_2 independently of R_2; or

R_2 and R_3 form a group of the formula (a)



(a)

where

each R_5 independently is hydrogen or $C_{1\text{-}4}$alkyl;

each R_6 independently is hydrogen or methyl; and

each R_7 independently is hydrogen, $C_{1\text{-}4}$alkyl,

$—CH_2Br$ or $—CH_2Cl$.

4,883,616

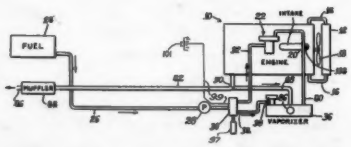
VAPORIZER/CARBURETOR AND METHOD

Ray M. Covey, Jr., 2901 Penwood, El Paso, Tex. 79935

Continuation-in-part of Ser. No. 640,352, Aug. 13, 1984, Pat. No. 4,611,567. This application Sep. 10, 1986, Ser. No. 905,472

Int. Cl.[4] F02M *31/14*

U.S. Cl. 261—64.4 **1 Claim**



1. Vaporizer/carburetor apparatus for retrofitting with a self-contained internal combustion engine utilizing petroleum fuel and for use in conjunction with such fuel in liquid form, and including a main carburetor having a fuel inlet, the engine providing vacuum in its operation, and having an exhaust pipe for exhaust gases, and further including a fuel line and means for transmitting fuel from a supply through the fuel line to a position adjacent the engine for use therein as stated more specifically herein below, said apparatus comprising,

a vaporizer unit including a casing having an exhaust passage extending transversely therethrough, and a fuel mixture passage including tubes extending through the exhaust passage, the entire surfaces of the tubes being exposed to exhaust gases in the exhaust passage, and the passages thereby having mutual heat exchange,

an auxiliary carburetor having a fuel inlet operably connected with the fuel line, and a fuel mixture outlet operably connected with the inlet of said fuel mixture passage in the vaporizer unit, the auxiliary carburetor including means for controlling the rate of flow of air therethrough and thereby controlling the rate of development of fuel mixture, and further, thereby controlling the rate of flow of the fuel mixture into said fuel mixture passage,

the fuel mixture from the auxiliary carburetor constituting the sole medium containing fuel entering into said fuel mixture passage,

a vapor line leading from the outlet of said fuel mixture passage in the vaporizer unit to the fuel inlt of the main carburetor, and

the casing having a normal position adjacent the horizontal, and mesh inserts positioned in the tubes, and the tubes sloping downwardly in direction opposite the flow of fuel therethrough.

4,883,617

METHOD OF FORMING BINDERLESS CARBON MATERIALS

Malcolm Benn, Sheffield; Alan Grint, Chertsey; Graeme P. Proud, Staines, and Brian Rand, Sheffield, all of England, assignors to The British Petroleum Company p.l.c., England

Filed Mar. 15, 1988, Ser. No. 168,215

Claims priority, application United Kingdom, Mar. 19, 1987, 8706499

Int. Cl.[4] B29B *11/12*; C01B *31/00*

U.S. Cl. 264—29.7 **6 Claims**

1. A process for the production of a solid carbon material having improved flexural strength which process comprises:

(a) grinding an unoxidized mesophase pitch and recovering ground particles to form ground particles substantially all of which are smaller than 10 micrometers in diameter,

(b) subjecting said ground particles to an oxidation treatment,

(c) forming said ground oxidized particles having substantially no particles greater than 10 micrometers into a shaped article and

(d) carbonising the article.

4,883,618

ABSORBABLE NERVE REPAIR DEVICE AND METHOD

Thomas H. Barrows, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 719,009, Feb. 4, 1985, which is a division of Ser. No. 569,557, Dec. 1, 1984, Pat. No. 4,534,349, which is a continuation-in-part of Ser. No. 463,242, Feb. 2, 1983. This application Feb. 17, 1987, Ser. No. 14,869

Int. Cl.[4] C08J *9/26*; B29C *67/14, 67/20*; A61B *17/04*

U.S. Cl. 264—49 **16 Claims**

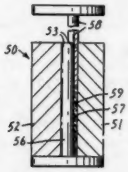
1. A process for preparing a longitudinally-openable, rough-surfaced, porous, tubular device for the repair of a lacerated, severed, or grafted nerve, said process comprising the steps:

(a) providing a mold cavity capable of producing said tubular device, the mold cavity having the shape of the desired device,

(b) filling said mold cavity with a body-absorbable polymer in the form of a nonwoven fibrous web,

(c) bonding said polymer fibers by means of at least one of

heat and solvent into a self-supporting longitudinally-openable, tubular device having a porosity in the range of



25 to 95 percent by volume and a coefficient of static friction, μ_s, in the range of 0.40 to 0.90, and

(d) removing said device from said mold cavity.

4,883,619

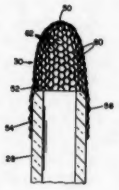
REFRACTORY METAL OXIDE PROCESSES

Walter J. Diederich, West Newbury, and Robert E. Nelson, Weston, both of Mass., assignors to TPV Energy Systems, Inc., Waltham, Mass.

Continuation-in-part of Ser. No. 408,511, Aug. 16, 1982, abandoned, and a continuation-in-part of Ser. No. 515,011, Jul. 20, 1983. This application Feb. 24, 1986, Ser. No. 833,322

Int. Cl.[4] C04B *33/32*

U.S. Cl. 264—60 45 Claims



1. A process for producing a sturdy refractory metal oxide article comprising the steps of

heating in an atmosphere in which the partial pressure of oxygen is less than two mm Hg a substrate of organic material impregnated with a metal nitrate compound to increase the temperature of said substrate at a rate of at least two degrees Celsius per minute to thermally decompose said metal nitrate compound as a step in the conversion of said metal nitrate compound to a refractory metal oxide such that evolved oxides of nitrogen interact with said organic substrate material to partially oxidize said organic substrate material;

further heating said impregnated substrate in an atmosphere containing an increased amount of oxygen to decompose and remove said organic material from said impregnated substrate and to complete the conversion of said metal nitrate compound to said refractory metal oxide so that a metal oxide replica of said substrate remains; and

further heating said metal oxide replica to sinter and strengthen said metal oxide replica such that said replica retains such strength after said replica has been heated to a temperature of 1500° C.

4,883,620

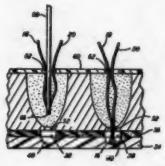
METHOD OF FABRICATION OF A DISINTEGRATING CASTING WEIGHT AND FISH ATTRACTOR

John L. Follett, 14554 Richmond Ave., Fair Haven, N.Y. 13064

Continuation-in-part of Ser. No. 17,481, Feb. 24, 1987, abandoned, which is a division of Ser. No. 717,039, Mar. 28, 1985, Pat. No. 4,663,881. This application Jul. 15, 1988, Ser. No. 220,999

Int. Cl.[4] B28B *1/08*

U.S. Cl. 264—72 14 Claims



1. A method of fabricating a fish attracting casting weight comprising:

(a) preparing a moldable mixture of water, soil and sand size stone;

(b) preparing a mold having an upper opening and a surface defining a substantially hemispherical cavity with a lower opening extending through said mold at an apex of said hemispherical cavity defining surface;

(c) positioning said mold with said apex facing downward;

(d) filling said cavity with said mixture such that said mixture includes an upper surface;

(e) subjecting said mold to a first vibration to compact said mixture in said cavity;

(f) inserting a length of flexible material having free ends and a medial portion into said compacted mixture through said upper surface of said compacted mixture and out through said lower mold opening such that said free ends of said flexible material extend out of said upper surface of said compacted mixture and said medial portion forms a small, closed loop extending out of said mold through said lower opening;

(g) subjecting said mold to a second vibration to compact said mixture about said flexible material;

(h) drying said compacted mixture to remove substantially all of said water therefrom and to fabricate said casting weight; and

(i) removing said casting weight with said flexible material embedded therein from said cavity.

4,883,621

METHOD FOR FORMING CAST ARTICLE BY SLIP CASTING

Tatsuo Natori, Kashiwa; Takashi Shimaguchi, Ibaraki; Akihide Watanabe, Ibaraki, and Toshihiro Yamada, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 9, 1986, Ser. No. 883,759

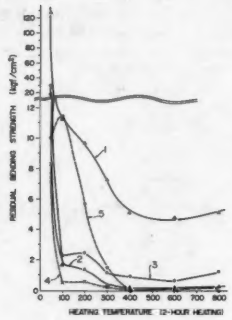
Claims priority, application Japan, Jul. 12, 1985, 60-152235; Nov. 1, 1985, 60-243953

Int. Cl.[4] C04B *33/28*

U.S. Cl. 264—86 23 Claims

1. A method for forming a cast article by slip casting through casting of a slip into a casting mold composed mainly of gypsum and removing of the casting mold after solidification of the slip, which comprises heating the casting mold prior to casting the slip therein, said casting mold being heated at a temperature of 120°–130° C. such that the strength of the casting mold is lowered, but is kept within a shape-maintaina-

ble range, then casting the slip into the casting mold, forming a green body from the slop, and removing the casting mold,



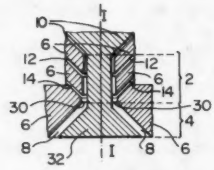
whereby cracks and internal stresses in the geen body due to the strength of the casting mold are avoided.

4,883,622

METHOD OF MANUFACTURING DISCRETE FIBER REINFORCED, PLASTIC TUBE AND APPARATUS THEREFOR

John M. Dealy, Westmount; Jean-Michael Charrier, Ile des Soeurs, and Shailesh Doshi, Montreal, all of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Sep. 17, 1987, Ser. No. 97,723
Int. Cl.[4] B29C *47/24*
U.S. Cl. 264—108 **6 Claims**



1. A method of extruding discrete fiber reinforced, plastic tube, comprising:

(a) introducing a first plastic material in an upstream portion of an annular die channel for forming an inner layer of the tube;

(b) introducing a second plastic material filled with discrete fibers in the upstream portion of the channel and around the whole of the inner layer for forming an intermediate layer of the tube;

(c) introducing a third plastic material in the upstream portion of the channel and around the whole of the intermediate layer for forming an outer layer of the tube; and

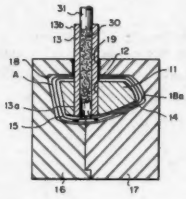
(d) co-extruding the materials through a downstream portion of the annular die channel which is divergent diametrically in the downstream direction so that at least a major portion of the fibers are oriented to extend predominantly in a general direction lying between the circumferential and the longitudinal axis of the tube with the orientation of the fibers being generally the same throughout the thickness of the intermediate layer.

4,883,623

METHOD FOR PRODUCING A GOLF CLUB HEAD

Itsushi Nagamoto; Tatsuo Nakanishi, and Tomoharu Yamashita, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Japan

Continuation of Ser. No. 092,431, Sep. 3, 1987, abandoned. This application Jan. 12, 1989, Ser. No. 296,848
Claims priority, application Japan, Nov. 28, 1986, 61-285552; Dec. 27, 1986, 61-313459; Sep. 8, 1987, 61-211223
Int. Cl.[4] B29C *33/12, 45/14, 45/16, 45/36*
U.S. Cl. 264—108 **6 Claims**



1. In a method for forming a golf club head in a split mold having a mold cavity to define the size and shape of the golf club head, the steps of:

a. forming a sized and shaped crude core with an infusion tube connected thereto and extending from the top to the bottom of the crude core so that the infusion tube has an end opening to the exterior of the bottom of the crude core,

b. covering the outersurface of the crude core with sheets of long fibrous material so that the sheets also cover the end opening of the infusion tube,

c. setting the covered crude core and infusion tube in the mold so that the infusion tube is held by the closed mold to fix the covered crude core in predetermined spaced relation to the walls of the mold cavity to define therewith a peripheral cavity about the crude core in which the fibrous sheet material is disposed in the peripheral space between the crude core and the mold cavity,

d. forcing fiber reinforced plastic under pressure from the open end of the infusion tube so that a substantial portion passes through the sheets of fibrous material pressing and orienting the combined fiber reinforced plastic and occluded fibrous sheets of materials against the walls of the mold cavity,

e. heating the mold to harden the fiber reinforced plastic in assembled position about the occluded fibrous sheets of material to form a shell having the desired size and shape of the golf club head, and

f. opening the split mold and separating the formed golf club head from the mold cavity.

4,883,624

METHOD AND APPARATUS FOR MANUFACTURING BLANKS OF SEMI-FINISHED PRODUCTS

Albert J. Spaay, Bretten, Fed. Rep. of Germany, assignor to Matec Holding AG, Kusnacht, Switzerland

Continuation of Ser. No. 835,229, Mar. 19, 1986, abandoned. This application Jan. 6, 1988, Ser. No. 143,274
Claims priority, application Fed. Rep. of Germany, Mar. 5, 1985, 3507720
Int. Cl.[4] B29C *31/08, 43/02;* D04H *5/04*
U.S. Cl. 264—112 **13 Claims**

1. A process for manufacturing products from fiber-reinforced synthetic resin compound and fiber matter comprising:

(a) making a plurality of batches of fiber-reinforced thermosetting synthetic resin compound without wrapping and having a sufficiently high viscosity that substantially no

impregnation of a glass fiber mat will occur at ambient temperature,

(b) providing a plurality of mats of material capable of being impregnated by said fiber-reinforced synthetic resin compound upon heating thereof, each said mat having an area and shape which correspond to the final product,

(c) providing molding apparatus including heatable molds,

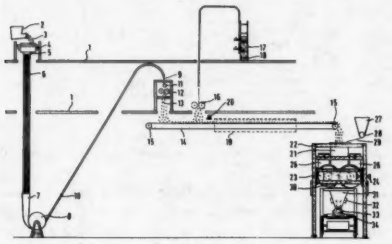
(d) placing a said batch of resin compound without wrapping on a said mat immediately after making said batch of resin compound,

(e) transporting a mat with a said batch of resin compound thereon to said molding apparatus, and

(f) molding said batch and mat in said molding apparatus by applying heat and pressure thereto.

7. Apparatus for manufacturing blanks form fiber-reinforced synthetic resin compounds for automatic feeding of synthetic resin molding presses, said presses producing fiber-reinforced synthetic resin goods, comprising:

(a) a molding plant for producing synthetic resin compound comprising a pair of rollers, means for rotating said rollers in opposite directions, and means for feeding pumpable



resin components, fiber components such as cut glass and mineral fibers and additives to the rollers, and vibrating hopper means for receiving material from said rollers;

(b) batching means for receiving material from said vibrating hopper means and for compressing the synthetic resin compounds received from said hopper means into batches of predetermined weight and density, said batching means being without means for wrapping said batches;

(c) means for producing resin bonded fiber mats with structure and filling weight adapted to the desired pattern of fiber reinforcement of the synthetic resin goods to be produced;

(d) stamping means for stamping pieces out of the fiber mat having shapes which conform to the shape of the synthetic resin goods to be produced;

(e) means for delivering each of said batches provided by said batching means, without wrapping thereon, onto a piece of fiber mat so that each batch of synthetic resin compound is supported by a piece of fiber mat, and

(f) means for transporting the fiber mat pieces together with the synthetic resin compound batches supported on them.

4,883,625

PROCESS FOR THE MANUFACTURE OF SECTIONS OF THERMOPLASTIC RESIN REINFORCED WITH CONTINUOUS FIBERS

Michel Glemet, Serquigny, and Gilles Cognet, Bernay, both of France, assignors to Societe Atochem, Puteaux, France

Filed Apr. 4, 1988, Ser. No. 176,854

Claims priority, application France, Apr. 9, 1987, 87 04996

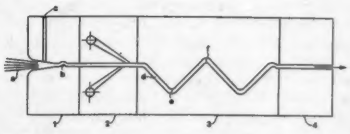
Int. Cl.[4] B05D *1/00;* B29C *47/02*

U.S. Cl. 264—136 **3 Claims**

1. In a process for the manufacture of articles of thermoplastic resin reinforced with continuous fibers by coating continuous rovings with thermoplastic resin, the improvement which comprises:

expanding the rovings to form a sheet of fibers aligned in parallel by passing the rovings through at least one baffle of a first baffle zone;

coating the fibers with molten resin to form a coated fiber sheet; and



passing the coated fiber sheet through an impregnation zone comprising a channel having at least two baffles opposite to, and parallel with, each other to force the resin to penetrate between the fibers wherein the baffles in the impregnation zone are parallel to at least one baffle in the first baffle zone.

4,883,626

METHOD OF MOLDING A MANHOLE FRAME FOR SPHERICAL TANKS

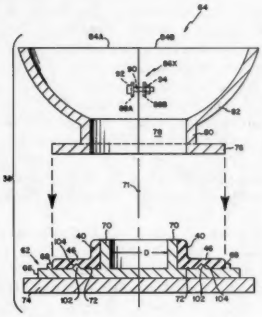
William J. Weidman, Old Tappan, N.J., and Edmund Netz, Rego Park, N.Y., assignors to Cardinal Tank Corp., Brooklyn, N.Y.

Division of Ser. No. 29,625, Mar. 24, 1987, Pat. No. 4,818,211.

This application Nov. 21, 1988, Ser. No. 274,274

Int. Cl.[4] B28B *1/48, 7/16, 1/34;* B29C *33/40*

U.S. Cl. 264—156 **10 Claims**



1. A method of making an access-hole frame for a spherical tank made of a moldable, nonmetal material, the access-hole frame including a cylindrical neck having a neck axis and circular top and bottom edges as oriented with the spherical tank and forming a cylindrical access hole, an outwardly extending, partly spherical collar connected to the bottom edge of the neck, and a radially outwardly extending access-hole flange having top and bottom sides an connected to the top edge of the neck, comprising the following steps:

(a) placing a bottom die piece onto a rotatable table; the bottom die means including a bottom die piece having a horizontal base wall, an outer matrix ring connected to the base wall, and an inner matrix ring connected to the base wall, the outer and inner matrix rings being centered at a common vertical axis adapted to be aligned with the axis of the neck of the to be formed access-hole frame, the outer matrix ring having an inner surface that extends vertically upwardly from the base wall; the inner matrix ring having an outer surface that extends vertically upwardly from the base wall; the base wall having an upper surface, the upper surface and the inner and outer surfaces

of the outer and inner matrix rings defining an access-hole-flange cavity in which the access-hole flange is formed;

(b) preparing an operational top die piece by joining a pair of top die pieces together by connecting at least one die-lock connected to the pair of top die pieces; the operational top die piece including a circular matrix flange having a circular center hole having an axis aligned with the vertical axis of the bottom die piece, the matrix flange being adapted to be placed in contact with the outer matrix ring of the bottom die piece and alignable with the horizontal base wall of the bottom die piece; the operational top die further including a cylindrical matrix wall having top and bottom rims, the bottom rim being connected to the matrix flange at the inner rim of the center hole, the cylindrical matrix wall having an axis coextensive with the vertical axis, the neck of the accesshole frame having a thickness, the cylindrical matrix wall having an inner surface which is spaced from the outer surface of the inner matrix ring of the bottom die piece at a distance that is the thickness of the neck; the operational top die further including an upwardly and outwardly dished matrix skirt configured as a segmented sphere and having top and bottom sides, the bottom side being connected to the top rim; wherein as mounted with the spherical tank the access-hole flange has a bottom surface, the neck has an outer surface, and the collar has an outer surface; wherein the matrix flange has a bottom surface which is the forming surface of the bottom surface of the access-hole flange; wherein the cylindrical matrix wall has an inner surface which is the forming surface of the outer surface of the neck; and wherein the matrix skirt has an inner surface which is the forming surface of the outer surface of the collar;

(c) activating the rotatable table so that it slowly turns;

(d) then spraying the surfaces defining the access-hole flange cavity and the outer surface of the inner matrix ring with a thin layer, preferably approximately 0.10 in., of catalyzed polyester resin so that the outer surface of the access-hole frame to be formed will have a glossy surface;

(e) then spraying the surfaces defining the access-hole flange cavity and the outer surface of inner matrix ring with a liquidized nonmetal molding material and a reinforcing material;

(f) then rolling out the liquidized molding material in order to completely wet the reinforcing material and to eliminate air inclusions;

(g) repeating steps (e) and (f) until the liquidized molding material fills the access-hole flange cavity to overflowing;

(h) then deactivating the rotatable table;

(i) then placing the joined top die pieces upon the bottom die piece centered at an axis so that excess liquidized molding material lying in the area of the access-hole flange cavity is forced from the bottom die piece so that air inclusions are eliminated; the joined top die pieces being sufficiently heavy so as to force the excess liquidized molding material from the bottom die piece;

(j) then activating the rotatable table;

(k) then spraying the inner surfaces of the cylindrical matrix wall and the skirt with a thin layer, approximately 0.10 in., of catalyzed polyester resin in order to give the surface of the access-hole frame a glossy surface;

(l) then spraying the inner surfaces of the cylindrical matrix wall and the skirt with the liquidized molding material in the manner set forth in step (e);

(m) then rolling out the liquidized molding material sprayed on in step (l) in order to eliminate air inclusions and in order to completely wet the reinforcing material mixed with the liquidized molding material; during rolling out the curvature of the skirt is followed;,

(n) repeating steps (l) and (m) until the projected wall thicknesses of the neck and the access-hole of the projected access-hole frame are attained;

(o) then allowing the liquidized moldable material to harden;

(p) then removing the bottom die piece from the formed access-hole frame by lifting the joined top die pieces away from the bottom die piece along with the formed access-hole frame;

(q) removing the joined top die pieces from the accesshole frame by first unconnecting the die-locks by freeing and removing the bolts and then pulling the joined top die pieces apart so as to free the access-hole frame;

(r) then inverting the access-hole frame so that the flange is on top, and the collar is on the bottom; and

(s) then drilling bolt holes through the access-hole flange at equal circular intervals concentric around the axis.

4,883,627

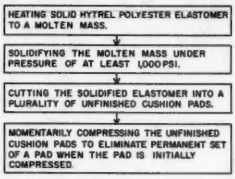
METHOD OF MAKING ELASTOMERIC CUSHION PAD

Raymond C. Hettlinger, 2279 Weir Dr., Hudson, Ohio 44236

Filed May 27, 1988, Ser. No. 199,456

Int. Cl.[4] B29C *43/02*

U.S. Cl. 264—157 **14 Claims**


HEATING SOLID HYTREL POLYESTER ELASTOMER TO A MOLTEN MASS.
SOLIDIFYING THE MOLTEN MASS UNDER PRESSURE OF AT LEAST 1,000 PSI.
CUTTING THE SOLIDIFIED ELASTOMER INTO A PLURALITY OF UNFINISHED CUSHION PADS.
MOMENTARILY COMPRESSING THE UNFINISHED CUSHION PADS TO ELIMINATE PERMANENT SET OF A PAD WHEN THE PAD IS INITIALLY COMPRESSED.

1. A method of forming an unannealed cushion pad, comprising the steps of:

(a) heating solid elastomeric material to a molten mass;

(b) solidifying the molten mass in an elongated chamber under a pressure of at least one thousand pounds per square inch, the axial length of the chamber being sufficient to form a plurality of cushion pads;

(c) removing the solidified material from the chamber and, without annealing it, cutting it crosswise into a plurality of cushion pads which have a thickness that is greater than and correlated to the correspondingly measured smaller thickness of a finished cushion pad; and

(d) compressing each unannealed pad sufficiently to at least substantially reduce permanent deformation of a pad which occurs when an uncompressed pad is initially compressed, to form a finished, unannealed cushion pad.

4,883,628

METHOD FOR PREPARING TENACITY AND MODULUS POLYACRYLONITRILE FIBER

Young D. Kwon, Morristown; Sheldon Kavesh, Whippany, and Dusan C. Prevorsek, Morristown, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 557,984, Dec. 5, 1983, abandoned. This application Sep. 18, 1986, Ser. No. 910,245

Int. Cl.[4] D01F *6/18*

U.S. Cl. 264—178 F **25 Claims**

1. A process comprising the steps:

(a) forming a solution of a substantially linear polyacrylonitrile having a weight average molecular weight at least about 500,000 in a first solvent at a first concentration of about 2 to about 15 weight percent polyacrylonitrile,

(b) extruding said solution through an aperture, said solution being at a temperature no less than a first temperature upstream of the aperture and being substantially at the first concentration both upstream and downstream of said aperture,

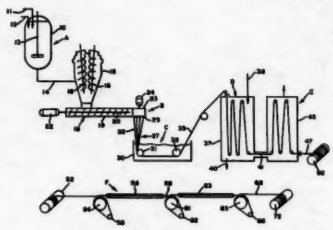
(c) cooling the solution adjacent to and downstream of the aperture to a second temperature below the temperature at which a rubbery gel is formed, forming a gel containing first solvent of substantially indefinite length,

(d) extracting the gel containing first solvent with a second, volatile solvent for a sufficient contact time to form a

fibrous structure containing second solvent, which gel is substantially free of first solvent and is of substantially indefinite length;

(e) drying the fibrous structure containing second solvent to form a xerogel of substantially indefinite length free of first and second solvent; and

(f) stretching at least one of:



(i) the gel containing the first solvent,

(ii) the fibrous structure containing the second solvent and,

(iii) the xerogel, at a total stretch ratio sufficient to achieve a tenacity of at least about 5 g/denier and a secant modulus of at least about 100 g/denier.

4,883,629

PROCESS FOR THE PRODUCTION OF DIMENSION-STABLE POLYESTER TIRE CORD

Bruno Lang, Ballwil, Switzerland, assignor to Viscosuisse SA, Emmenbruücke, Switzerland

Continuation of Ser. No. 870,311, Jun. 3, 1986, abandoned. This application Oct. 14, 1988, Ser. No. 259,510

Claims priority, application Switzerland, Jun. 19, 1985, 02597

Int. Cl.[4] D02J *1/22*

U.S. Cl. 264—289.6 **1 Claim**

1. Process for the production of dimension-stable polyester tire cord, comprising of at least 95 percent by weight of polyethylene terephthalate having a limit viscosity of more than 0.70 dl/g and a titer of at least dtex 1100×2, by means of a heat treatment of the polyester cord, including hot stretching and hot relaxation, the stretching effected at a higher temperature than the relaxation, wherein the polyester tire cord is stretched between 3 and 7 percent in a first process step, and the polyester tire cord is relaxed between 3 and 7 percent in a second process step at a temperature between 205°–250° C. resulting in a total stretching of less than 5%.

4,883,630

METHOD FOR PRODUCING HOLLOW ARTICLES OF THERMOPLASTIC MATERIALS

Günter Langecker, Meinerzhagen, Fed. Rep. of Germany, assignor to Battenfeld Fischer Blasformtechnik GmbH, Lohmar, Fed. Rep. of Germany

Filed Dec. 22, 1986, Ser. No. 944,856

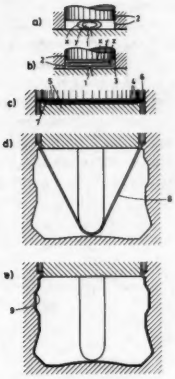
Claims priority, application Fed. Rep. of Germany, Dec. 20, 1985, 3545162

Int. Cl.[4] B29C *49/06, 49/12, 49/22, 49/64*

U.S. Cl. 264—513 **17 Claims**

1. A method of producing hollow articles of thermoplastic materials, comprising the steps of

preparing a compact blank composed of at least two plastics material layers which surround one another by successively injecting the plastics material components for each layer into a mold cavity until the mold cavity is filled, the mold cavity having a variable volume, the volume of the mold cavity being adjusted as each plastics material component is injected, the adjustment of the volume being carried out at a rate in accordance with the rate of flow of each plastics material component as each plastics material component enters the mold cavity, so that the volume of the mold cavity is adjusted from a minimum volume corresponding to the quantity of the first plastics material component injected in the mold cavity to a maximum volume corresponding to the quantities of all plastics material components injected in the mold cavity,



conditioning at least portions of the blank from outside the blank while the blank is in a heated state by an additional heat treatment,

removing the heated blank from the mold cavity,

reducing the thickness and increasing the surface area size of the heated blank by a compression molding operation, and

stretching and blow-molding the compressed heated blank into a hollow article.

4,883,631

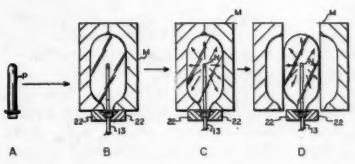
HEAT SET METHOD FOR OVAL CONTAINERS

Prakash R. Ajmera, Toledo, Ohio, assignor to Owens-Illinois Plastic Products Inc., Toledo, Ohio

Continuation of Ser. No. 909,800, Sep. 22, 1986, abandoned. This application Apr. 27, 1988, Ser. No. 188,092

Int. Cl.[4] B29C *35/16, 49/06, 49/08, 49/18*

U.S. Cl. 264—528 **28 Claims**



1. In a method for making a partially crystalline, biaxially oriented, heat set plastic container from a hollow polyethylene terephthalate parison having an open end and a closed end, comprising engaging the open end of the parison which is at a temperature within its molecular orientation temperature range, enclosing the parison in a hot mold, the mold being at heat-setting temperature of 180° C. to 230° C., expanding the parison to form the container within the blow mold by introducing a blow molding fluid within the parison, to induce biaxial orientation of the parison and force the parison into intimate contact with the blow mold, and to maintain contact of the parison with the blow mold by the internal pressure of the blow molding fluid for a time sufficient to induce partial crystallization of the plastic material, and further comprising the steps of: cooling the container with a cooling fluid that

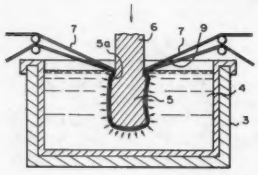
changes its state to cool by the latent heat of vaporization, the cooling fluid being selected from the group consisting of liquid carbondioxide, liquid nitrogen, and a combined mixture of water vapor and sub-zero temperature air, the cooling fluid having a positive pressure sufficient to allow the cooling fluid to change its state and to keep the container in contact with the heated mold, while at the same time exhausting the blow molding fluid with the hot mold closed, the cooling within the mold being for a time of 0.5 to 9.5 seconds until the average temperature of the container is reduced to a condition such that it will not expand under the positive pressure of the cooling fluid but would collapse in the absence of the positive pressure of the cooling fluid so that the positive pressure of the cooling fluid prevents the container from collapsing when the hot mold is opened, and continuing to cool the container while preventing the container from collapsing when the hot mold is opened with positive pressure of the cooling fluid until the container is self-sustaining.

4,883,632

METHOD FOR SHAPING THERMOPLASTIC FABRICS

Fumio Goto, and Taro Otawa, both of Kurashiki, Japan, assignors to Namba Press Works Co., Ltd., Kurashiki, Japan

Filed Oct. 21, 1988, Ser. No. 265,671
Claims priority, application Japan, Feb. 23, 1987, 62-038154
Int. Cl.[4] B29C *51/42*
U.S. Cl. 264—544 11 Claims



1. A method for shaping thermoplastic fabrics comprising:

(a) preparing a cover material from fabrics composed of fibers having both crystalline and non-crystalline regions therein, or thermoplastic films,

(b) providing a liquid metallic bath comprising eutectic mixtures of metals and having an eutectic point at least equal to or higher than the softening point of said non-crystalline regions or said thermoplastic films, and lower than the melting point of said crystalline regions or said films, and said metallic bath being heated to a temperature higher than the eutectic point and lower than the melting point of said crystalline regions or said films, said metallic bath having relatively high density,

(c) using an uppr mold having three dimensional outer configurations substantially corresponding to outer contours of final products to be obtained for pushing down and immersing said cover materials into said liquid metallic bath to thereby cause said cover material to follow the outer configurations of said upper mold and be shaped accordingly,

(d) taking out the shaped cover material from said bath along with said upper mold, and cooling said cover material, and

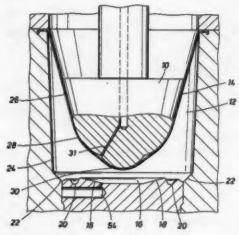
(e) withdrawing said upper mold from the inside of said shaped cover material.

4,883,633

PROCESS AND APPARATUS FOR PRODUCTION OF ARTICLES WITH SELECTIVELY THINNED PORTIONS USING A MULTI-RADIUS FORMING PLUG

Kent H. French, Newport News, Va., assignor to Rampart Packaging Inc., Houston, Tex.

Filed Dec. 24, 1987, Ser. No. 137,839
Int. Cl.[4] B29C *51/10*
U.S. Cl. 264—550 10 Claims



1. In a process for making cupped articles from thermoplastic sheet or billets which comprises clamping a heated sheet or billet of a thermoplastic material in the solid phase state between a forming plug and a hollow mold having an end opening, moving the forming plug into the opening to carry the sheet or billet into the mold and stretch a portion of the sheet or billet and introducing pressure fluid into the stretched portion of the sheet or billet to form said article by making the sheet or billet conform to the shape of the hollow mold, the improvements which comprise

forming a bellows bottom in the cupped articles by providing the hollow mold with a closed end having a flat central portion, a tapered portion which extends outwardly from the central portion, tapers in the direction of the open end of the mold and ends in a first ridge which extends away from the open end and vertically beyond the flat central portion, and a second ridge which extends away from the open end of the mold and horizontally beyond the first ridge, and

forming said bellows bottom with selectively thinned portions by providing the forming plug with inwardly tapering sides which terminate in a curved portion, said curved portion terminating at a plug tip wherein the radius of the curved portion is greater than the radius of the plug tip.

4,883,634

PROCESS FOR MANUFACTURING A HIGH MODULUS POLY-P-PHENYLENE TEREPHTHALAMIDE FIBER

Terry S. Chern, Richmond, Va.; Stephan C. De La Veaux; Jacob Lahijani, both of Wilmington, Del., and James E. Van Trump, Hockessin, Del., assignors to E. I. DU Pont De Nemours and Company, Wilmington, Del.

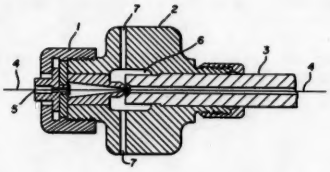
Continuation-in-part of Ser. No. 868,667, May 30, 1986, abandoned. This application Apr. 27, 1987, Ser. No. 41,589
Int. Cl.[4] D01D *10/02*
U.S. Cl. 264—555 6 Claims

1. A process for manufacturing a fiber of poly-p-phenylene terephthalamide having a modulus greater than 1100 grams per denier and tenacity of greater than 18 grams per denier, the polymer of said fiber having a Crystallinity Index of at least 75%, comprising the steps of:

exposing a wet never dried fiber of poly-p-phenylene terephthalamide having absorbed therein 20 to 100% of water based on the weight of dry fiber and having an acidity of less than 60 and a basicity of less than 10, to a turbulent, heated atmosphere wherein the atmosphere, in the direct vicinity of the fiber being exposed, has a flow of greater than Reynolds Number 10,000 throughout the duration of

the exposure, the atmosphere has a temperature of 500 to 660 degrees,

the exposure is for a duration of 0.25 to 3 seconds, and



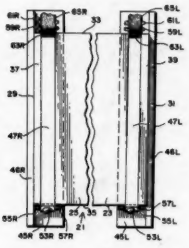
the fiber is maintained at a tension of 1.5 to 4 grams per denier.

4,883,635

MEANS FOR MANUALLY HOLDING A STACK OF KARATE BOARDS

Gerald Goradesky, 17425 NE. 7th Ave., North Miami Beach, Fla. 33162

Filed May 26, 1988, Ser. No. 199,320
Int. Cl.[4] A63B *69/00*
U.S. Cl. 272—76 **13 Claims**



1. Means for manually holding a stack of one or more karate boards in a striking position, each board having opposed major board surfaces, two opposite, substantially parallel sides, and marginal areas adjacent said sides,

said manual holding means comprising two physically separate components adapted to be used together with said board, each said component comprising:

an elongated slat having a contact surface adapted to contact one of said marginal areas on the outside board of said stack,

handle means mounted longitudinally on said slat opposite said contact surfaces,

a strap having a proximal end portion attached to said slat,

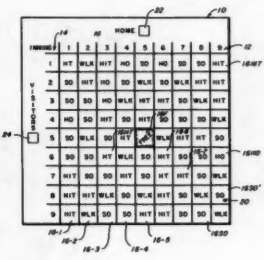
and means for fastening said strap around said stack and to said slat to bind said component to said stack such that said components are physically separated when in said striking position wherein said strap fastening means includes a transverse proximal slot and distal slots in each of said slats such that said straps are inserted into said slots for fastening said boards to said components.

4,883,636

BASEBALL BINGO GAME

Willard E. Fantle, Jr., 1828 - 13th St., Greeley, Colo. 80631

Filed Sep. 29, 1988, Ser. No. 250,511
Int. Cl.[4] A63F *3/06*
U.S. Cl. 273—269 **15 Claims**



1. A game card for use in combination with a baseball game, the card including:

nine rows and nine columns which intersect to form a nine-by-nine matrix having eighty-one zones, each zone being associated with a particular inning and containing indicia which corresponds to a regulation offensive play associated with a baseball game;

the card further including means for identifying the rows according to the at-bat attempts of one team participating in the baseball game, and further means for identifying the columns according to the at-bat attempts of the other team participating in the baseball game;

means for identifying when said one team executes the regulation offensive play indicated in a particular zone during its at-bat attempt in the inning associated with that particular zone; and

means for identifying when the other team executes the regulation offensive play indicated in a particular zone during its at-bat attempt in the inning associated with that particular zone.

4,883,637

CLOSURE ARRANGEMENT FOR SPENT NUCLEAR FUEL SHIPPING CONTAINERS

John D. McDaniels, Jr., Duluth, Ga., assignor to Nuclear Assurance Corporation, Norcross, Ga.

Filed Aug. 25, 1988, Ser. No. 236,204
Int. Cl.[4] G21F *5/00*
U.S. Cl. 376—272 **15 Claims**

11. A closure system for closing and sealing a cask member having an open end, said closure system comprising

a stepped bore in the open end of said cask member, said bore having a first diameter forming a first shoulder within the open end of said cask, and a second, larger diameter forming a second shoulder in said bore, the wall of said bore formed by the first diameter having a continuous annular groove therein, and the wall of said bore formed by the second diameter having one or more radially extending slots formed therein,

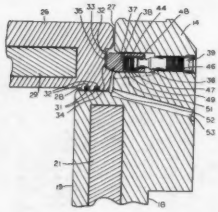
a first closure member adapted to rest upon said first shoulder,

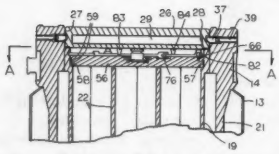
a second closure member adapted to rest upon said second shoulder,

said second closure member having a continuous peripheral groove,

first locking means mounted on one surface of said first closure member having a plurality of blade members having locked and unlocked positions and adapted to fit into said annular groove when in said locked position,

second locking means mounted in said one or more radially extending slots having locked and unlocked positions and adapted to engage said peripheral groove of said second closure member when in said locked position,





means for forcing said second locking means into engagement with said second closure member, and

sealing members mounted in said first and second closure members.

4,883,638

METHOD AND DEVICE FOR PRODUCING A FRICTION OR RUBBING ELEMENT

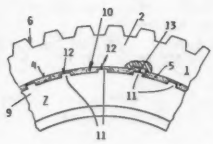
Fred Blankenhagen, Penzberg, and Hermann Pütz, Schongau, both of Fed. Rep. of Germany, assignors to Enfo Grundlagenforschungs AG, Döttingen, Switzerland

Filed May 10, 1988, Ser. No. 192,700

Claims priority, application Austria, May 20, 1987, 1282/87

Int. Cl.[4] B22F *7/00*

U.S. Cl. 419—9 **3 Claims**



1. A method for producing a friction or rubbing element for clutches, brakes, bearings or the like, which consists of a metal ring element with at least one uneven friction or rubbing surface which is substantially rotationally symmetrical about the ring axis and to which a spray-sintered lining is applied, the ring element being placed in an at least largely level position together with a sinter mould disposed substantially concentrically to the side of the friction or rubbing surface in such a manner as to maintain an annular gap, the annular gap being filled with sinter powder, sintering being carried out at sintering temperature, and the spray-sintered lining being compacted, characterised in that in order to compact the the sinter powder contained in the annular gap (10) at sintering temperature, a sinter mould (7) is used of a material having a coefficient of thermal expansion which is different from that of the ring element (2), and which in the case of an internal sinter mould (7) is greater than and in the case of an external sinter mould is less than that of the ring element (2).

4,883,639

METHOD OF MANUFACTURING AN OBJECT OF A POWDERED MATERIAL BY ISOSTATIC PRESSING

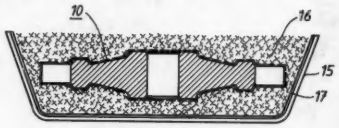
Jan Adlerborn; Hans Larker, and Jan Nilsson, all of Robertsfors, Sweden, assignors to ABB Cerama AB, Robertsfors, Sweden

Filed Dec. 16, 1988, Ser. No. 285,597

Claims priority, application Sweden, Dec. 18, 1987, 8705058

Int. Cl.[4] B22F *1/00*

U.S. Cl. 419—49 **9 Claims**



1. A method of manufacturing an object of a powdered material by isostatic pressing of a body, preformed from the powdered material, whereby the preformed body is surrounded by a casing, which consists of a boron oxide-containing glass or a boron oxide-containing material which forms glass upon heating and which at least for the main part is transferred to molten phase, before the isostatic pressing is carried out while sintering the powder, wherein in that the boron oxide containing glass, or the material forming glass when heated, contains 48–52 percent by weight boron oxide, 46–50 percent by weight silicon dioxide and 1.5–2.5 percent by weight aluminium oxide.

4,883,640

TITANIUM-NIOBIUM-NICKEL BRAZING ALLOY

Howard Mizuhara, Hillsborough, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jun. 17, 1988, Ser. No. 207,803

Int. Cl.[4] C22C *14/00, 19/03, 30/00*

U.S. Cl. 420—417 **6 Claims**

1. A brazing alloy having a brazing temperature of about 1020° to 1250° C. consisting of, in weight percent, 37–75 titanium, 5–43 niobium, 20–58 nickel.

4,883,641

CLOSURE AND CONTAINER ASSEMBLY FOR BIOLOGICAL STERILITY INDICATOR

James H. Wicks, and William E. Foltz, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

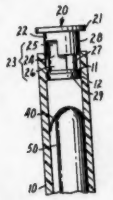
Continuation-in-part of Ser. No. 66,586, Jun. 26, 1987, abandoned, which is a continuation of Ser. No. 823,535, Jan. 29, 1986, abandoned, which is a continuation of Ser. No. 621,554, Jun. 18, 1984, abandoned. This application Sep. 27, 1988, Ser. No. 249,982

Int. Cl.[4] B65D *51/16*

U.S. Cl. 422—50 **15 Claims**

1. A closure and container assembly comprising a closure having a top and a depending sidewall, and a container having an interior surface and an opening for receiving the closure, wherein the closure is movable between two positions within the container such that when in the first position the container is sealed and when in the second position fluid communication exists between an environment outside of the container and the interior of the container via a tortuous pathway defined by at least one recess along the interior surface of the container or

the exterior surface of the sidewall of the closure which tortuous pathway is constructed and arranged to cause at least two deflections of a fluid entering the container and to require that said fluid entering the container flow in a direction which forms an angle of 90° or less with an axis running through the center of said container, from said opening to the bottom of said container, to displace fluid in the container and is sized and shaped to accommodate a rapid rate of flow therethrough so that when tested to determine the flow resistance thereof, in a



test wherein a hole is drilled in said bottom of said container and the hole is connected to a source of air, upon forcing air from the source of air through the container across the tortuous pathway, when the closure is in its second position and the assembly is placed in a tank of water at the bottom of a 20 cm column of water extending above the surface of the water in the tank, the air flowing across the tortuous pathway and into the column of water under 10 mm Hg pressure will displace a 90 ml, 14 cm column of water in a maximum time of 10 seconds.

4,883,642

MEANS TO AUTOMATICALLY HOLD, PROCESS, STORE AND ANALYZE BIOLOGICAL SAMPLES

Jean-Claude Bisconte, Vaucresson, France, assignor to Universite Paris-Nord, Villetaneuse, France

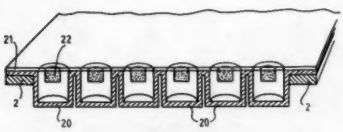
PCT No. PCT/FR85/00138, § 371 Date Sep. 11, 1986, § 102(e) Date Sep. 11, 1986, PCT Pub. No. WO85/05563, PCT Pub. Date Dec. 19, 1985

PCT Filed Jun. 4, 1985, Ser. No. 865,736

Claims priority, application France, Jun. 5, 1984, 84 08769

Int. Cl.[4] G01N *35/02*

U.S. Cl. 422—66 **8 Claims**



1. A device for the automatable analysis of biological samples, comprising:

a flexible coiled, non-hydrophobic polymeric ribbon, said ribbon having two longitudinally extending laternal edges, a longitudinally extending biological storage zone for storing biological samples on a first lateral section of an upper surface of said ribbon, and a longitudinally extending first data storage zone longitudinally coextensive with said biological storage zone and made of a magnetic or optical data storage medium for storing said data specific to each biological sample to be stored on said biological storage zone, on a second lateral section of a longitudinal surface of said ribbon, said second lateral section being at a lateral edge of said ribbon and spatially distinct from said first lateral section, a longitudinally extending second data storage zone longitudinally coextensive with said biological storage zone and made of said data storage medium, for storing data specific to each biological sample to be stored on said biological storage zone, on a third lateral section of said ribbon at a laternal edge of said ribbon and spatially distinct from said first and second lateral sections, said biological storage zone being positioned centrally with respect to said lateral edges and between said first and second data storage zones wherein said data storage medium of both said first and second data storage zones is attached to a lower surface of said ribbon, opposite said upper surface, so that said first and second data storage zones form, respectively, first and second shoulders downwardly depending from each said lateral edge, so as to form a reservoir between adjacent turns of said coil and between said lateral shoulders, said shoulders contacting the upper surface of said ribbon at an adjacent lower turn of said coil, said data storage medium being capable of storing data indicating the longitudinal location of any biological sample stored on said biological storage zone.

4,883,643

OXYGEN SENSOR PROTECTED AGAINST CONTAMINANTS

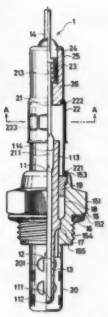
Hisaharu Nishio, and Toshio Okumura, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Continuation of Ser. No. 129,878, Dec. 4, 1987, abandoned, which is a continuation of Ser. No. 876,061, Jun. 19, 1986, abandoned. This application Mar. 28, 1989, Ser. No. 332,425

Claims priority, application Japan, Jun. 20, 1985, 60-931169

Int. Cl.[4] G01N *31/12*

U.S. Cl. 422—94 **6 Claims**



1. An oxygen sensor comprising:

an oxygen detecting element in a tubular form of a solid electrolyte which is closed at a lower end and opened at the other upper end and which has a conductive layer deposited on both outer and inner surfaces;

an output terminal, one end of which is retained at an upper portion of the open end of said oxygen detecting element;

a first tube which surrounds and protects said oxygen detecting element and said output terminal;

a second tube having a lower end portion surrounding an upper end portion of said first tube, vertical air flow pas-

sages being provided between said first and second tubes and extending to the uppermost end of said first tube so that the length of said air flow passage is maximized; and

air-permeable, water- and oil-impermeable spacer means having a lower end abutting against an uppermost end of said first tube and having an upper end fitted into an upper end of said second tube, said spacer means circumscribing said output terminal for insulating said output terminal and covering uppermost ends of said vertical air flow passages, for permitting atmospheric air to flow therethrough while blocking oil and water, said spacer means being molded from a mixture of an inorganic fiber and a thermal plastic resin.

4,883,644

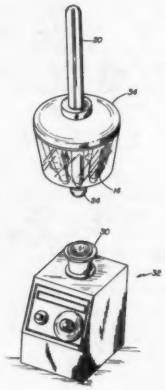
MICROTUBE VORTEXER ADAPTER AND METHOD OF ITS USE

Daniel Perlman, Arlington, Mass., assignor to Brandeis University, Waltham, Mass.

Filed Dec. 9, 1987, Ser. No. 130,412

Int. Cl.[4] B01L *9/00;* **B01F** *11/00*

U.S. Cl. 422—104 **10 Claims**



1. A vortex adapter suitable for holding a plurality of tubes to be vortexed and for subjecting the tubes simultaneously to vortex forces, said adapter being adapted for use with a vortexing machine having a vibrating cup, said adapter comprising:

an elongated handle;

a base connected to said handle with said handle extending above said base, said base comprising a plurality of fixed apertures sized to receive a plurality of tubes respectively, each of said apertures having an upper portion and a lower portion with said upper portion positioned closer to the top of said base than said lower portion; and

a nipple connected to and positioned below said base, wherein said nipple is constructed and configured to be received into the cup of the vortexing machine while said adapter is held at said handle, and wherein said nipple, said base, and said handle are structurally associated in a manner whereby rotation of said nipple by insertion into the cup causes vibration of said base and causes tubes held within said apertures in said base to be subject to vortex forces wherein said adapter has a first longitudinal axis parallel to said handle, and a said aperture forms a second longitudinal axis extending from said upper portion to said lower portion, and wherein said first and second axes form an acute angle to each other wherein the distance of said second axis from said first axis in said upper portion is greater than the distance of said second axis from said first axis in said lower portion.

4,883,645

DEVICE FOR PREPARING AND EJECTING A CHEMICALLY REACTING MIXTURE

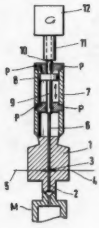
Klaus Pontius, Hermeskeil, and Manfred Settinger, Ockten, both of Fed. Rep. of Germany, assignors to Klöckner Ferromatik Desma GmbH, Malterdingen, Fed. Rep. of Germany

Filed Aug. 21, 1987, Ser. No. 87,786

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1986, 3629042

Int. Cl.[4] C08J *9/00;* **B29C** *45/02;* **B01F** *5/04, 15/02*

U.S. Cl. 422—133 **3 Claims**



1. A device for preparing a chemically reacting mixture, and for ejecting the mixture into a mold, the mixture comprising at least two components, in particular a mixture of isocyanate and a polyol that reacts completely to form polyurethane, the device comprising a mixing head having an outwardly open bore, a reciprocable ram coupled to said head, said ram having an ejector rod axially movable in said bore for therewith defining a mixing chamber and for ejecting the mixture from said chamber, said head having inlet passages for inletting the respective components into said chamber for preparing the mixture, means associated with said ram for axially moving said rod for ejecting the mixture out of said chamber, said rod having a circular cross-section and said bore having a cross-section complementary thereto, and drive means coupled to said ram for rotating said rod about its longitudinal axis continuously during the preparation of the mixture, whereby any adherence of the mixture to said rod and to the wall of said bore is substantially avoided.

4,883,646

SYSTEM AND DEVICE TO MAKE CATALYTIC BASKET WALLSFOR HETEROGENEOUS SYNTHESIS REACTORS

Umberto Zardi, Breganzona, Switzerland, assignor to Ammonia Casale S.A., Switzerland

Filed Sep. 23, 1987, Ser. No. 100,023

Claims priority, application Switzerland, Sep. 25, 1986, 03837/86

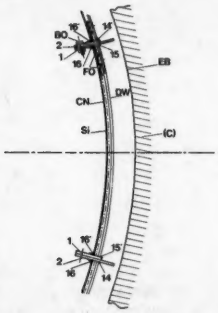
Int. Cl.[4] B01J *8/02*

U.S. Cl. 422—311 **2 Claims**

1. An apparatus for joining two outer wall segments of a catalyst basket inserted into an existing heterogeneous synthesis reactor for revamping the reactor, comprising:

two elongated upstanding flange plates having heights substantially coextensive with the wall segments, the flange plates having different widths and oriented in a substantially radial direction with respect to a central longitudinal axis of the basket, both flange plates having portions extending inside the catalyst basket, and one flange plate having a portion extending outward past the catalyst basket outer wall segment, the flange plates stiffening and

centering the catalyst basket for uniform gas distribution in the reactor; and,



means for joining together the portions of the two flange plates extending inside the catalyst basket.

4,883,647

USE OF MANGANESE NODULES OR DEEP-SEA ORES CONTAINING MANGANESE FOR THE REDUCTION OF NITROGEN OXIDES IN EXHAUST GASES

Hartmut Kainer, Wiesbaden; Daniel Grimm, Schlangenbad; Wilfried Schnelle, Geseke, and Peter Halbach, Clausthal-Zellerfeld, all of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Oct. 8, 1987, Ser. No. 107,483

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1986, 3634553

Int. Cl.[4] C01B *21/00*

U.S. Cl. 423—239 **18 Claims**

15. A catalytic process for removing at least a portion of pollutants from an exhaust gas, said process comprises the steps of:

providing a catalyst material for removing pollutants from an exhaust gas;

passing the exhaust gas over said catalyst material to thereby remove at least a portion of said pollutants;

passing at least one additional reactant over said catalyst material, said at least one additional reactant comprising NH_3; and

catalytically reacting at least one of said pollutants in the exhaust gas with said at least one additional reactant;

said catalyst material comprising at least one of:

1. manganese nodules; and

2. a deep-sea ore containing manganese.

4,883,648

CUBIC BORON NITRIDE MANUFACTURE

Geoffrey J. Davies, 36 Boundary Road, Linden Ext., Randburg, Transvaal; Lesley K. Hedges, 4 Oriole Mews, Delphinium Street, Brackenhurst, Transvaal, and Stuart H. Robertson, 92 Duke of York Avenue, Northcliff Ext. 4, Johannesburg, Transvaal, all of South Africa

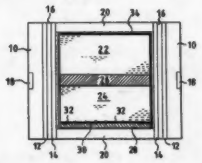
Filed Jul. 29, 1987, Ser. No. 79,259

Claims priority, application South Africa, Jul. 30, 1986, 86/5695

Int. Cl.[4] C01B *21/064*; C30B *29/38*

U.S. Cl. 423—290 **3 Claims**

1. A method of producing CBN crystals including the steps of placing a reaction vessel into the reaction zone of a high pressure/high temperature apparatus, the reaction vessel containing CBN seed material, a CBN source separated from the seed material and sandwiched between two masses of solvent-/catalyst for CBN synthesis which is capable of melting under CBN synthesis conditions, and contains sufficient hexagonal boron nitride to saturate the catalyst with boron nitride when molten, the separation of seed material and source material being such that under the operating conditions of CBN synthesis a temperature gradient is created between the seed material and the source material with the seed material being located at a point near the minimum value of temperature of the temperature gradient and the source material being located at a point near the maximum value of temperature for the temperature gradient in the reaction zone of a high temperature/high pressure apparatus and subjecting the contents of the reaction vessel to conditions of temperature and pressure in the CBN stable region of the boron nitride phase diagram for not more than 24 hours to produce CBN crystals.



4,883,649

IODINATED CLONIDINE DERIVATIVES AS RADIOACTIVE IMAGING TRACERS

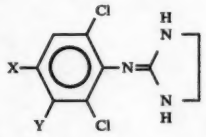
Raymond E. Counsell; Marcian Van Dort, and Richard Neubig, all of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Continuation of Ser. No. 774,260, Sep. 10, 1985, abandoned. This application Oct. 13, 1988, Ser. No. 257,181

Int. Cl.[4] A61K *43/00*; C07D *403/30*

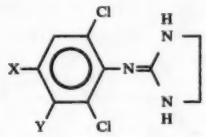
U.S. Cl. 424—1.1 **20 Claims**

1. A compound, and the salts thereof, of the formula:



wherein X is selected from the group consisting of radioactive isotopes of iodine and NH2 and Y is H or, when X is NH2, Y is selected from the group consisting of iodine and radioactive isotopes of iodine.

19. A radioactive binding assay composition for 2-adrenergic receptor sites, said assay composition comprising an effective amount of the compound of the formula:



wherein X is selected from the group consisting of radioactive isotopes of iodine and NH2 and Y is H or, when X is NH2, Y is a radioactive isotope of iodine.

4,883,650

RADIOIDOHIPPURIC ACID ESTER, A CONJUGATE THEREOF, AND METHODS OF MAKING THE SAME

Kuldeep K. Bhargava, Bronx; Lakshman R. Chervu, Larchmont, and M. Donald Blaufox, Rye, all of N.Y., assignors to ALbert Einstein College of Medicine - of Yeshiva University, Bronx, N.Y.

Filed Apr. 13, 1988, Ser. No. 181,229

Int. Cl.[4] A61K *49/02, 39/395;* **C07D** *207/46*

U.S. Cl. 424—1.1 **7 Claims**

1. The N-hydroxysuccinimide ester of iodohippuric acid wherein said iodohippuric acid is radioiodinated.

4,883,651

DEODORANT

Holger Meyer, Elfenbeinweg 15, 2000 Hamburg 65, Fed. Rep. of Germany

Filed May 9, 1988, Ser. No. 191,978

Claims priority, application Fed. Rep. of Germany, May 14, 1987, 3716129

Int. Cl.[4] A61K *7/32, 9/12;* **A61L** *9/01*

U.S. Cl. 424—47 **2 Claims**

1. A deodorant composition comprising an effective amount of an extract of coffee arabinensis and an extract of rhubarb.

4,883,652

TETRAHYDRO-1,3,THIAZINE-2,4 DIONES, USE THEREOF AND SKIN TREATING COMPOSITIONS CONTAINING THEM

Wolfgang Hanefeld, Marburg, Fed. Rep. of Germany; Rudi Röthlisberger, Marly, and Friedrich Noser, Bonnefontaine, both of Switzerland, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany

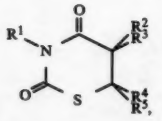
Division of Ser. No. 30,247, Mar. 24, 1987, Pat. No. 4,746,738, which is a continuation of Ser. No. 653,238, Sep. 7, 1984, abandoned. This application Mar. 2, 1988, Ser. No. 162,870

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1983, 3304871

Int. Cl.[4] A61K *7/40, 7/42, 7/48*

U.S. Cl. 424—59 **4 Claims**

1. A cosmetic skin treatment composition comprising, in a physiologically compatible cosmetic carrier, an effective amount of at least one tetrahydro-1,3-thiazine-2,4-dione of the general formula (I)



(I)

wherein R^1 represents H, alkyl (C1–C4), phenyl, phenyl alkyl (C1–C4), phenyl substituted in para positioning with alkyl (C1–C4), halogen, nitro, alkoxy (C1–C4), phenyloxy or cyano, phenyl alkyl (C1–C4) substituted in para positioning in the phenyl moiety with alkyl (C1–C4), halogen, nitro, alkoxy (C1–C4), phenyloxy or cyano, R^2 and R^3 are independently H, phenyl, phenyl substituted in para positioning with alkyl (C1–C4), halogen, nitro, alkoxy (C1–C4), phenyloxy or cyano, R^4 and R^5 are independently H, alkyl (C1–C4) or phenyl.

4,883,653

ARYL N,N-BIS CINNAMAMIDE COMPOUNDS AND THEIR USE AS ULTRAVIOLET LIGHT STABILIZERS

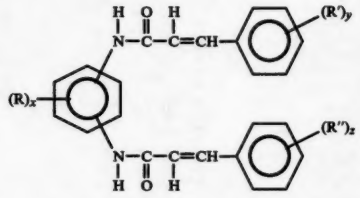
Robert J. Raynor, North Branford, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed Jun. 25, 1984, Ser. No. 623,859

Int. Cl.[4] A61K *31/165;* **C07C** *103/78, 103/76*

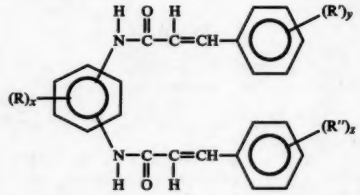
U.S. Cl. 424—60 **5 Claims**

1. An organic composition susceptible to ultraviolet degradation stabilized against such degradation with an effective stabilizing amount of an aryl N,N'-bis cinnamamide compound having the formula:



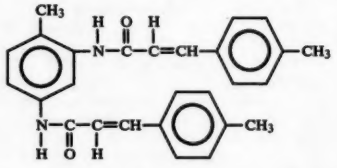
wherein x equals an integer from 1 to 3; y equals an integer from 0 to 2; z equals an integer from 0 to 2; each R is individually selected from the group consisting of a lower alkyl group having 1 to 4 carbon atoms, a lower alkoxy group having from 1 to 4 carbon atoms, a nitro group, an aryl group having 6 to 18 carbon atoms; and each R' and R'' is individually selected from the group consisting of a lower alkyl group having from 1 to 4 carbon atoms, a lower alkoxy group having from 1 to 4 carbon atoms, a halo group, a nitro group or an aryl group having from 6 to 18 carbon atoms.

3. A sunscreen composition which effectively prevents UV light from penetrating human skin or hair said sunscreen composition comprising a human sunscreen carrier and an effective screening amount of an aryl N,N'-bis cinnamamide compound having the formula:

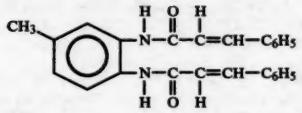


wherein x equals an integer from 1 to 3; y equals an integer from 0 to 2; z equals an integer from 0 to 2; each R is individually selected from the group consisting of a lower alkyl group having 1 to 4 carbon atoms, a lower alkoxy group having from 1 to 4 carbon atoms, a nitro group, an aryl group having 6 to 18 carbon atoms; and each R' and R'' is individually selected from the group consisting of a lower alkyl group having from 1 to 4 carbon atoms, a lower alkoxy group having from 1 to 4 carbon atoms, a halo group, a nitro group or an aryl group having from 6 to 18 carbon atoms.

4. An aryl N,N'-bis cinnamamide compound having the formula:



5. An aryl N,N'-bis cinnamamide compound having the formula:



4,883,654
COSMETIC PREPARATION
Deborah A. Young, 20 Panama Court, Keswick, Ontario, Canada (L4P 3L7)
Continuation of Ser. No. 1,853, Jan. 9, 1987. This application Oct. 6, 1988, Ser. No. 254,152
Int. Cl.[4] A61K *11/56*
U.S. Cl. 424—69 12 Claims

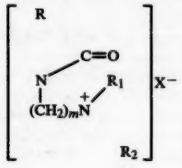
1. A toiletry formulation for cosmetic use in masking local skin irritation in the eye brow area arising from mechanical depilation;

said formulation incorporating desensitizing agent in a cosmetically acceptable, stable, spreadable lotion or cream;

the desensitizing agent comprising in the range of from 0.4 to 0.8% of menthol, and in the range of from 0.5 to 2.0% or eugenol, based on the weight of the formulation.

4,883,655
QUATERNIZED NITROGEN CONTAINING POLYCYCLIC COMPOUNDS
Robert B. Login, Oakland; Ratan K. Chaudhuri, Butler; David J. Tracy, Lincoln Park, and Michael W. Helioff, Westfield, all of N.J., assignors to GAF Corporation, Wayne, N.J.
Continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,900. This application Aug. 28, 1987, Ser. No. 91,010
Int. Cl.[4] C07D *401/06, 403/06, 413/06, 417/06*
U.S. Cl. 424—70 18 Claims

1. The quaternized compound having the formula



wherein X^- is a chloride, bromide or iodide anion; m is an integer having a value of from 1 to 4; R is linear alkylene having from 3 to 8 carbon atoms and is optionally substituted with C_1 to C_4 alkyl; R_1 forms a double bond in the heterocyclic ring with the quaternized nitrogen or is selected from the group consisting of alkyl, hydroxyalkyl, alkyleneoxyalkyl, aryl, alkaryl, aralkyl, aralkenyl and alkylene amidoalkyl and R_2, together with the quaternary nitrogen atom forms a 5 to 14 membered heterocyclic structure optionally substituted with alkyl and having a single heteroatom.

11. The process of adding an effective hair or skin conditioning amount of the compound of claim 1 to a cosmetic formulation.

4,883,656
COMPOSITION AND METHOD FOR THE OXIDATIVE DYEING OF HAIR
Eugen Konrad, Darmstadt; Herbert Mager, Fribourg, and Axel Hoffmann, Reinheim, all of Fed. Rep. of Germany, assignors to Wella Aktiengesellschaft, Darmstadt, Fed. Rep. of Germany
PCT No. PCT/EP87/00144, § 371 Date Nov. 12, 1987, § 102(e) Date Nov. 12, 1987, PCT Pub. No. WO87/05801, PCT Pub. Date Oct. 8, 1987
PCT Filed Mar. 12, 1987, Ser. No. 133,130
Claims priority, application Fed. Rep. of Germany, Mar. 27, 1986, 3610396
Int. Cl.[4] A61K *7/13*
U.S. Cl. 424—70 10 Claims

1. Composition for the oxidative dyeing of hair based upon a combination of coupler substance and developer substance, comprising

(A) 0.1 to 5.0 percent by weight 5-amino-2-methylphenol or a physiologically compatible salt thereof as coupler substance and

(B) 0.1 to 4.0 percent by weight 4-amino-3-methylphenol or a physiologically compatible salt thereof and

(C) 0.1 to 2.0 percent by weight 1,4-diaminobenzene, 2,5-diaminotoluene or a mixture of 1,4-diaminobenzene and 2,5-diaminotoluene or physiologically compatible salts thereof

as developer substance, whereby the weight percents are in proportion to the total weight of the composition.

4,883,657
REARRANGER PROCESS AND COMPOSITION FOR PERMANENT WAVING PROCESS
Barry W. Williams, Chicago, Ill., and Pamela M. Daniels, Gary, Ind., assignors to Soft Sheen Products, Inc., Chicago, Ill.
Filed Feb. 19, 1988, Ser. No. 158,209
Int. Cl.[4] A61K *7/09;* A45D *7/04*
U.S. Cl. 424—72 13 Claims

1. A process for waving hair, comprising the following steps in combination:

(a) applying to the hair a rearranging composition with chemical properties sufficient to break the cystine bonds in the hair keratin, said rearranging composition comprises a homogenous mixture of a salt of thioglycolic acid, and a cationic homopolymer of methylacrylamidopropyltrimethyl ammonium chloride;

(b) rinsing the hair to substantially remove the rearranging composition;

(c) applying a wrapping lotion composition to the hair;

(d) wrapping the hair around a rod to produce a curl pattern and allowing the hair and wrapping lotion to set for a predetermined length of time;

(e) rinsing the wrapped hair;

(f) applying a neutralizer composition to the curl pattern; and

(g) rinsing the hair to substantially remove the neutralizer composition, whereby the process produces thicker, fuller hair with loose, bouncy curls.

4,883,658
OPHTHALMIC SOLUTION FOR TREATMENT OF DRY-EYE SYNDROME
Frank J. Holly, 301 York Ave., Lubbock, Tex. 79416
Continuation of Ser. No. 856,531, Apr. 28, 1986, Pat. No. 4,794,980. This application May 16, 1988, Ser. No. 194,215
Int. Cl.[4] A61K *31/74, 31/79*
U.S. Cl. 424—80 4 Claims

1. An aqueous solution exhibiting a surface tension similar to that of aqueous tears while forming a completely water-wettable absorbed layer over an hydrophobic surface such as glossy polyethylene, which comprises:

a partially hydrolyzed polyvinyl acetate having at least 73%

but no more than 90% of its acetate groups hydrolyzed to alcohol in combination with a fully hydrolyzed polyvinyl alcohol having more than 99% of its acetate groups hydrolyzed to alcohol;

wherein the weight ratio of partially hydrolyzed polyvinyl acetate to fully hydrolyzed polyvinyl alcohol is within the range from 1:2 to 1:5; and

a viscous hydrophilic polymer.

4,883,659

SKIN TREATMENT PREPARATION

Jack J. Goodman, Morristown, N.J.; Harvey S. Tauman, Boca Raton, Fla.; Charles Fox, Fairlawn, and Thomas J. Hart, Dover, both of N.J., assignors to Dento-Med Industries, Inc., Boca Raton, Fla.

Filed Aug. 24, 1988, Ser. No. 235,630

Int. Cl.[4] A61K *31/74, 31/78, 7/00;* **C08F** *18/00*

U.S. Cl. 424—78 **9 Claims**

1. A stable oil in water emulsion containing an ammonium salt of a long chain fatty acid as a emulsifying agent, 2-hydroxyethyl methacrylate homopolymer in the aqueous phase and a combination of 2-hydroxyethyl methacrylate homopolymer solvents of different activities, at least one is volatile and at least one is nonvolatile, in said aqueous phase.

4,883,660

GEL BASES FOR PHARMACEUTICAL COMPOSITIONS

Steven T. Blackman, New York, and Irene Ralske, North Bellmore, both of N.Y., assignors to Thames Pharmacal Co., Inc., Ronkonkoma, N.Y.

Filed Oct. 17, 1988, Ser. No. 258,581

Int. Cl.[4] A61K *31/74, 9/66, 9/48*

U.S. Cl. 424—78 **10 Claims**

1. A pharmaceutical composition comprising a gel base including:

(a) from about 0.5 to about 10.0% by weight $CH_3(CH_2)_{21}(OCH_2CH_2)_nOH$ and from about 90 to about 99.5% of a glycol solvent, or

(b) from about 2.5 to about 10.0% by weight $CH_3(CH_2)_x(OCH_2CH_2)_nOH$ and from about 90 to about 97.5% of a glycol solvent,

wherein n is an integer from 2 to 30 and x is an integer from 15 to 20, the base being anhydrous and substantially free of any added gelling agents, and a topically, systemically or orally active pharmaceutical agent dissolved therein or admixed therewith.

4,883,661

USE OF ARGININE AS AN LYMPHOKINE SYNERGIST

John M. Daly, 559 Ferndale La., Haverford, Pa. 19041, and John Reynolds, 4617 Pine St., Apt. H-510, Philadelphia, Pa. 19143

Filed Oct. 9, 1987, Ser. No. 107,287

Int. Cl.[4] A61K *37/02, 45/02*

U.S. Cl. 424—85.2 **9 Claims**

1. An improved method of treating a mammal with interleukin-2 to increase the receptivity of cells of said mammal to said lymphokine to enhance the cytotoxic effect of said lymphokine on cells of said mammal wherein said improvement comprises administering interleukin-2 to said mammal in combination with an amount of arginine effective to increase the receptivity of cells of said mammal to interleukin-2.

4,883,662

METHOD OF INCREASING NATURAL KILLER CELL POPULATION OF CANCER PATIENTS

Robert L. Stout, Overland Park, Kans., assignor to Clinical Biotechnologies, Inc., Kansas City, Mo.

Continuation of Ser. No. 818,779, Jan. 13, 1986, abandoned, which is a continuation-in-part of Ser. No. 598,744, Apr. 10, 1984, Pat. No. 4,572,834. This application Jan. 6, 1987, Ser. No. 872

Int. Cl.[4] A61K *39/42, 39/395, 35/16, 37/02*

U.S. Cl. 424—101 **4 Claims**

1. An in vivo method of increasing the Natural Killer cell population in the blood of a cancer patient, said method comprising the steps of:

injecting a biologic into the bloodstream of said cancer patient, and allowing said biologic to operate therein for a period of time to increase said Natural Killer cell population,

said biologic being a glycoprotein and having an apparent molecular weight of above about 100,000 and being derived from the blood of an animal injected with a virus, wherein the aminal's blood containing the biologic is fractionated to separate potentially interfering substances from the biologic, said virus being a feline panleukopenia or canine origin parvo virus and said animal being other than a feline or canine which is a nonpermissive host for the virus, said virus-injected animal being allowed to react to the presence of the virus such that 50 microliters of the animal's serum, when added to an in vitro human white blood cell culture containing $2\text{–}4\times10^5$ white blood cells and followed by three days inclubation at 37° C. under a 5% CO_2/95% air atmostphere, will give rise to at least about a 50% increase in T-helper and Natural Killer cells in the biologic-supplemented cell culture as compared with an otherwise identical in vitro cell culture having added thereto 50 microliters of serum from a normal animal of the same species as said injected animal, such rise in T-helper and Natural Killer cells being detected by staining with fluorescent-labeled monoclonal antibodies against T-Helper and Natural Killer cells.

4,883,663

THERAPEUTIC POWDER AND PROCESS OF MANUFACTURING

Rogue O. Leon Leon, Buenavista No. 46, Col., Lindavista, Mexico D.F. 07300

Filed Sep. 9, 1987, Ser. No. 94,615

Claims priority, application Mexico, Sep. 9, 1986, 298

Int. Cl.[4] A61L *35/78*

U.S. Cl. 424—195.1 **10 Claims**

1. A method of manufacturing a therapeutic powder for treatment of skin injuries comprising the steps of:

providing a wood material selected from the group consisting of the bark of a Mimosa tree, the outer layer of wood of the Mimosa tree that is stripped away from the tree with the bark of the tree, and a mixture of said bark and said wood, roasting said wood material for a time and temperature sufficient for curative active ingredients in said wood material to separate from the cells containing said active ingredients, and grinding said wood material into a powder.

4,883,664

MEDICINAL SALVE

Mary Sharkey, 80 George Ave., North Adams, Mass. 01247

Filed Jun. 29, 1987, Ser. No. 67,806

Int. Cl.[4] A61K *35/78, 31/19, 31/20, 31/125*

U.S. Cl. 424—196.1 **2 Claims**

1. A medicinal salve for the topical treatment of burns, scalds, insect bites and the like, said salve comprising 2 parts olive oil by volume, 1 part bee's wax by volume, 1 part cam-

phor by volume, 4 parts anhydrous lanolin by volume a trace of pine rosin.

4,883,665

PROCESS FOR PRODUCING LIPOSOME COMPOSITION

Koichiro Miyazima, Uji; Keiko Tomita, Nara, and Masayuki Nakagaki, Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 786,305, Oct. 10, 1985, abandoned. This application Aug. 15, 1988, Ser. No. 232,539
Claims priority, application Japan, Apr. 11, 1985, 60-78173
Int. Cl.[4] A61K *37/22*; A01N *25/26*
U.S. Cl. 424—417 7 Claims

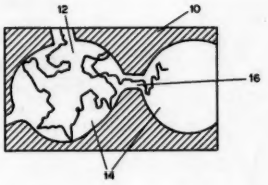
1. A process for producing liposome compositions, which comprises (1) preparing liposomes entrapping an internal aqueous solution composed of (a) an effective amount of a hydrophilic drug selected from the group consisting of antitumor agents, antiviral agents, antibiotics, peptide hormones, enzymes, immunopotentiating agents or proteins and (b) at least one saccharide selected from the group consisting of D-glucose, D-galactose, D-mannose and maltose in a concentration of 0.1 to 1M, wherein the concentration of maltose is based on the molarity converted to glucose units, (2) adding the resulting liposomes to an external aqueous solution containing at least one member selected from the group consisting of glucose, galactose, mannose, maltose in a concentration of 0.1 to 1M, wherein the concentration of maltose is based as above, and (3) freezing the resulting aqueous solution containing the liposomes.

4,883,666

CONTROLLED DRUG DELIVERY SYSTEM FOR TREATMENT OF NEURAL DISORDERS

Bernhard A. Sabel, Munich, Fed. Rep. of Germany; Andrew Freese, Jamaica Plain, and William M. Saltzman, Somerville, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 29, 1987, Ser. No. 43,695
Int. Cl.[4] A61F *13/00*; A61K *9/14*
U.S. Cl. 424—422 22 Claims



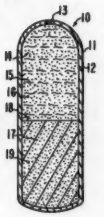
1. A method for treating disorders of the nervous system comprising: Selecting a compound which stimulates or replaces a specific function of components or the nervous system selected from the group consisting of L-dopa, dopamine, carbidopa, choline, acetyl choline, cholinergic neuronotropic agents, gangliosides, nerve growth enhancing agents, antipsychotropic agents, antidepressants, excitatory amino acid antagonist or agonist, antiepileptic medications enzymes and combinations thereof; selecting a biocompatible polymer; encapsulating said compound within said polymer to form a polymeric device having at least one opening at the surface, wherein said compound is linearly released from said polymeric device over a sustained period of time greater than three months at a predetermined level and rate to the nervous system.

4,883,667

PROCESS FOR FORMING DISPENSING DEVICE

James B. Eckenhoff, Los Altos, Calif., assignor to ALZA Corporation, Palo Alto, Calif.

Division of Ser. No. 42,197, Apr. 24, 1987, which is a continuation of Ser. No. 766,456, Aug. 16, 1985, Pat. No. 4,704,118. This application Nov. 27, 1987, Ser. No. 126,079
Int. Cl.[4] A61K *9/22*; A61M *31/00*
U.S. Cl. 424—438 1 Claim



1. A process for forming a dispensing device to deliver a beneficial agent to a fluid environment of use having a temperature of at least 24° C., wherein the process comprises providing a dispenser by the steps of:

(a) mixing a beneficial agent with a carrier means for absorbing thermal energy from the environment of use for forming a flowable composition;

(b) mixing an expandable means for absorbing fluid and swelling with a weight means for increasing the specific density of the expandable means thereby forming an expandable weight means;

(c) placing the composition formed in (a) in contacting arrangement with the expandable weight means formed in (b);

(d) surrounding said contacting arrangement with a wall comprising in at least a part of a semipermeable composition permeable to the passage of fluid and impermeable to the passage of a beneficial agent; and,

(e) forming a passageway through the wall for delivering the beneficial agent from the dispenser to the environment of use over time.

4,883,668

MATERIAL FOR ENDERMIC ADMINISTRATION PRE-TREATMENT

Midori Ohta, Funabashi, Japan, assignor to Kabushiki Kaisya Advance, Tokyo, Japan

Continuation of Ser. No. 144,034, Dec. 11, 1987, abandoned. This application Feb. 15, 1989, Ser. No. 309,892
Claims priority, application Japan, Apr. 24, 1986, 61-93405
Int. Cl.[4] A61F *13/02*
U.S. Cl. 424—448 11 Claims

1. In inontophoretic transdermal drug administration, the improved method which comprises pre-treating a portion of the skin to which the drug administration is to be made by pressing a substance capable of removing stratum corneum, and which is substantially uniformly distributed on a support in the form of small areas discontinuous to each other at a density of 0.001 to 5%, against a portion of the skin to which the drug administration is to be made, adhering said substance to the stratum corneum on said skin, and removing the substance together with the support from the skin so as to remove a portion of the stratum corneum and provide fine openings in the stratum corneum having reduced impedance and permitting enhanced iontophoretic transdermal drug administration.

4,883,669

TRANSDERMAL ABSORPTION DOSAGE UNIT FOR ESTRADIOL AND OTHER ESTROGENIC STEROIDS AND PROCESS FOR ADMINISTRATION

Yie W. Chien, North Brunswick; Chia-Shun Lee, Highland Park, both of N.J.; Kirti H. Valia, Indianapolis, Ind., and Te-Yen Chien, Piscataway, N.J., assignors to Rutgers, The State University of New Jersey, New Brunswick, N.J.

Continuation-in-part of Ser. No. 705,194, Feb. 25, 1985, and a continuation-in-part of Ser. No. 770,968, Aug. 30, 1985, abandoned. This application May 30, 1986, Ser. No. 868,709

Int. Cl.[4] A61F *13/02*

U.S. Cl. 424—448 **20 Claims**

1. A transdermal pharmaceutical-containing polymer matrix dosage unit having the following components:

(a) a backing layer which is substantially impervious to the pharmaceutical to be delivered transdermally;

(b) a polymeric matrix disc layer which is adhered to said backing layer and which has microdispersed therein an amount of a pharmaceutical selected from the group consisting of an estradiol; non-estradiol estrogenic steriods capable of transdermal absorption and which will provide a dosage amount of said pharmaceutical to be delivered transdermally; esters thereof which are absorbable by the skin of the subject being treated and which are bioconvertible after transdermal absorption to estradiol or said non-estradiol estrogenic steriods; and pharmaceutically effective combinations thereof; and

(c) an adhesive means for securing the dosage unit to the subject treated for transdermal absorption and which has distributed therein an amount in the range from zero up to an effective amount of one or more skin permeation enhancers to provide substantial skin absorption enhancement for said pharmaceutical;

said polymeric matrix disc layer covered by and adhered to said adhesive means or being in direct contact with the skin of the subject treated.

4,883,670

COSMETIC PREPARATIONS CONTAINING UBIDECARENONES

Vincenzo Zappia, and Mario De Rosa, both of Naples, Italy, assignors to Arval S.p.A., Milan, Italy

PCT No. PCT/EP87/00614, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO88/03015, PCT Pub. Date May 5, 1988

PCT Filed Oct. 19, 1987, Ser. No. 222,914

Claims priority, application Italy, Oct. 23, 1986, 22105 A/86; Sep. 10, 1987, 48373 A/87

Int. Cl.[4] A61K *37/22*

U.S. Cl. 424—450 **6 Claims**

1. A ubidecarenone derivative formed by the addition of an N-acyl-2-amino-ethane-sulphonate to ubideceronone, the acyl radical of said sulphonate having more than 5 carbon atoms and said ubidecarenone and said sulphonate being at least in equimolar ratio.

4,883,671

MANUFACTURING MACHINE FOR SAGGED SELF-SUPPORTING CABLE

Fumio Onodera; Hiroshi Uchimi, and Toshio Koseki, all of Miyagi, Japan, assignors to Kitanihon Electric Wire Co., Ltd., Sendai, Japan

Filed Jan. 22, 1988, Ser. No. 147,201

Claims priority, application Japan, Jul. 31, 1987, 62-190217

Int. Cl.[4] H02G *7/06*

U.S. Cl. 425—122 **7 Claims**

1. A manufacturing machine for sagged self-supporting cable comprising:

a turntable;

drive means for imparting rotation to said turntable;

several die casting means including molds adapted to selectively open and close to define a mold cavity, said die casting means being circumferentially mounted on said turntable;

mold assembling means for selectively opening and closing said molds;

a sag adjusting device mounted on said turntable for adjusting a position of a main cable so as to be longer between adjacent die cast means than a suspension wire, said sag adjusting device includes a first plate and a second plate, said first and second plates being adjustably secured relative to each other and to said turntable for selectively adjusting a spacing between a main cable and a suspension wire; and

an injection means disposed adjacent to a crimping point and moving synchronously with said die casting means and filling said mold cavity with crimping material for securing a relative positioning of a main cable relative to a suspension wire.

4,883,672

METHOD FOR PREVENTING DIET INDUCED CARNITINE DEFICIENCY IN DOMESTICATED DOGS AND CATS

Austin L. Shug, 1201 Shorewood Blvd., and Bruce W. Keene, 625 N. Blackhawk Ave., both of, Madison, Wis. 53705

Filed Apr. 29, 1988, Ser. No. 187,870

Int. Cl.[4] A23K *1/00*

U.S. Cl. 426—2 **7 Claims**

1. A method for preventing diet-induced carnitine deficiency in a domesticated dog or cat, comprising the step of: administering daily to said dog or cat a prophylactic amount of L-Carnitine.

4,883,673

METHOD FOR INHIBITING BACTERIAL SPOILAGE AND RESULTING COMPOSITIONS

Carlos F. Gonzalez, College Station, Tex., assignor to Microlife Technics, Inc., Sarasota, Fla.

Filed Feb. 9, 1987, Ser. No. 12,619

Int. Cl.[4] A01N *65/00;* **A23C** *9/12*

U.S. Cl. 424—195.1 **13 Claims**

1. A method for inhibiting gram-positive bacteria in an unspoiled food system which comprises:

adding a bacteriocin into the unspoiled food system in an effective amount which inhibits the bacteria, wherein the bacteriocin is derived from a *Pediococcus* containing DNA derived from a plasmid measuring about 6.2 Mda which encodes production of the bacteriocin, to provide in the food system between about 10 and 100,000 **Au of the bacteriocin per gram of the food system which is sufficient for the bacteriocin to inhibit the Gram-positive bacteria.**

4,883,674

CONTROLLED ATMOSPHERE CUT FRUIT PACKAGE AND METHOD

Steve T. Fan, Maple Grove, Minn., assignor to General Mills, Inc., Minneapolis, Minn.

Continuation of Ser. No. 921,501, Oct. 22, 1986, abandoned. This application Dec. 16, 1987, Ser. No. 135,553

Int. Cl.[4] A21D *10/02*

U.S. Cl. 426—118 **7 Claims**

1. A packaged food article for the extended refrigerated storage of cut fruit produce blends, comprising:

A. a sealed imperforate continer;

B. a quantity of a perishable produce consisting essentially of a blend of cut fruit pieces disposed within the container forming a produce bed having a bed depth ranging from about 1 to 3 inches, said blend being a mixture of a plurality of fruit species,

wherein the container has at least a portion fabricated from a gas permeable material such as to allow about 4 to 12 cc of O_2 per oz of produce blend per day to permeate into the package,

said produce blend at the time of packaging in said container having an initial microbial load of less than about 1000 APC per gram of blend and a respiration rate of less than 10 mg CO_2/kg-hr at 40°–45° F., and having inactivated surface browning enzymes;

wherein the container has an initial atmosphere upon sealing within said container consisting essentially of

about 15% to 30% by volume oxygen,

about 0.1% to 5% by volume carbon dioxide, and the balance being substantially all molecular nitrogen,

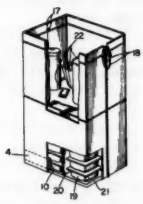
said container and produce blend being selected such that said container has an equilibrium atmosphere within said container comprising 2 to 5% by volume oxygen, 10 to 15% by volume carbon dioxide, and the balance being substantially all molecular nitrogen, said equilibrium atmosphere being obtained from five to 10 days after sealing and wherein the container is substantially free of chemical agents capable of absorbing gases.

4,883,675

FLEXIBLE PACKAGE HAVING MAIN COMPARTMENT AND ANCILLARY COMPARTMENT

Donna M. Wernz, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Nov. 30, 1988, Ser. No. 277,750
Int. Cl.[4] B65D *30/22, 85/62*
U.S. Cl. 426—120 12 Claims



1. A flexible package having a sealed main compartment and an openable compartment for ancillary materials, said package comprising:

(a) a main compartment having a top wall and a bottom wall interconnected to one another by a multiplicity of side walls;

(b) an ancillary compartment vertically extended from said main compartment; and

(c) a column of product units totally enclosed and sealed within said main compartment and adjacent at least one of said side walls; and

(d) a continuous line of weakness for creating a dispensing opening within at least one of said main compartment side walls for removing said product units one at a time without other product units protruding from said flexible package; and

(e) an opening at the top axial end of said ancillary compartment for inserting and removing ancillary materials; and

(f) means for repeatedly opening and closing said ancillary compartment opening without damaging said flexible package

4,883,676

METHOD OF FORMING LIQUID SMOKE

Spyros Sophianopoulos, Willowdale; Kenneth S. Darley, Ajax, both of Canada, and Louis Sair, Evergreen Park, Ill., assignors to The Griffith Laboratories, Limited, Scarborough, Canada

Filed May 21, 1987, Ser. No. 52,065
Int. Cl.[4] A23B *4/04*
U.S. Cl. 426—314 11 Claims

1. A method of forming a liquid smoke, which comprises:

feeding dry sawdust to a combustion zone and forming a thin layer thereof having an exposed upper surface in said combustion zone,

feeding a dry molecular oxygen-containing gas stream to said combustion zone,

heating said combustion zone to a temperature at least sufficient to effect combustion of said sawdust,

combusting said sawdust in said thin layer while said molecular oxygen-containing gas stream sweeps over said exposed surface of the combusting sawdust in said combustion zone from an inlet thereto to an outlet therefrom to produce a combustion product gas stream containing condensible vapors,

said sawdust layer having a thickness no greater than that which will permit efficient heat transfer to the sawdust layer in said combustion zone and efficient volatilization of volatile combustion products from the sawdust layer into the sweeping molecular oxygen-containing gas stream to form said product gas stream while the formation of char and ash in said combustion zone is substantially avoided,

removing said product gas stream from said combustion zone from said outlet therefrom, and

condensing said condensible vapors from said removed product gas stream to produce liquid smoke.

4,883,677

METHOD OF ARRANGING A FORM OF PROCESSED MEAT

Tadao Aiga, Tokyo, and Masoyoshi Kimura, Chiba, both of Japan, assignors to Kureha Chemical Industry Co., Limited, Tokyo, Japan

Division of Ser. No. 7,649, Jan. 28, 1987, abandoned. This application Sep. 1, 1988, Ser. No. 240,002
Claims priority, application Japan, Jan. 29, 1986, 61-12093
Int. Cl.[4] A23B *4/04*
U.S. Cl. 426—420 6 Claims

1. A method of arranging a form of processed meat comprising:

arranging string made of polyvinylidene chloride on raw meat, said string having a heat contraction property; and

heating the meat with the string to cause said string to contract;

whereby a form of the heated meat is arranged by the heat contraction of the string.

4,883,678

METHOD FOR SHAPING A SPHERICAL BODY

Yasunori Tashiro, Utsunomiya, Japan, assignor to Rheon Automatic Machinery Co., Ltd., Tokyo, Japan

Division of Ser. No. 900,074, Aug. 9, 1986, Pat. No. 4,734,024. This application Jan. 28, 1988, Ser. No. 149,538
Claims priority, application Japan, Jan. 16, 1986, 61-6925; Feb. 11, 1986, 61-27587
Int. Cl.[4] A21C *3/00, 3/10, 3/04*
U.S. Cl. 426—496 4 Claims

1. A method of shaping a spherical body consisting of dough crust and a filling, comprising:

feeding a cylindrical body consisting of dough crust and a filling through an opening defined by at least three members, and applying constrictive force to the cylindrical

body from around it and perpendicularly to the direction of movement of said cylindrical body,

wherein said force is applied to said cylindrical body with at least three members of an assembly horizontally aligned around said cylindrical body, each member having two sliding surfaces, each surface of a member slidably adjoining a sliding surface of an adjacent member in a nonoverlapping manner.

4,883,679

BRINE FOR CONSERVING CUCUMBER

Pentti K. Sewón, Pirttiläbdevägen 11, Åbo, Finland (SF-20310)

Filed Jul. 14, 1988, Ser. No. 219,007

Int. Cl.[4] A23B *7/10*

U.S. Cl. 426—532 **2 Claims**

1. Brine for conserving cucumber in bulk, comprising in solution per liter of the brine: at least 0.15 kg sodium chloride, 0.01–0.05 kg acetic or lactic acid or a non-toxic salt thereof, at least 1 g each of sodium benzoate, calcium chloride, and potassium sorbate, and at least 50 mg each of ascorbic acid and citric acid.

4,883,680

PROCESS FOR PREPARING DRY ACETALDEHYDE AND PRODUCT PRODUCED THEREBY

Brian Byrne, North Brunswick, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

Filed Dec. 2, 1988, Ser. No. 279,171

Int. Cl.[4] A23L *1/226*

U.S. Cl. 426—534 **1 Claim**

1. A process for preparing a dry form of acetadehyde comprising the steps, in sequence of:

(a) mixing a modified food starch with water thereby forming a mixture of water and modified food starch;

(b) adjusting the pH of the resulting mixture of modified food starch and water to a pH in the range of from about 7.2 up to about 7.5 thereby forming a pH-adjusted mixture of modified food starch and water;

(c) initimately admixing acetaldehyde with the pH-adjusted mixture of modified food starch and water; and

(d) freeze-drying the resulting mixture whereby the resulting freeze-dried product is free of paraldehyde and crotonaldehyde.

4,883,681

PROCESS FOR PREPARING AN EDIBLE DISPERSION

Peter B. Ernsting, Delft, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed Jun. 2, 1988, Ser. No. 201,518

Claims priority, application United Kingdom, Jun. 5, 1987, 8713266

Int. Cl.[4] A23D *5/00*

U.S. Cl. 426—573 **19 Claims**

1. Continuous process for the preparation of an edible plastified dispersion having a continuous fat phase and a dispersed aqueous phase consisting essentially of:

(i) cooling a constituted emulsion having a continuous aqueous phase and a dispersed fat phase and comprising essentially no solid fat, which emulsion is prepared by admixing at least two different compositions, one comprising a continuous fat phase and the other comprising a continuous aqueous phase, said cooling being achieved by passing said emulsion through a static heat exchanger to cause partial crystallization of fat, the emulsion leaving the heat exchanger as a dispersion having a continuous aqueous phase and containing crystallized fat, and

(ii) feeding the dispersion from the step (i) directly to means for imparting kinetic energy so as to invert the dispersion into a dispersion having a continuous fat phase and a dispersed aqueous phase.

4,883,682

PROCESS FOR THE PREPARATION OF A STERILIZED CASEIN-BASED LIQUID COMPOSITION

Jehuda Stein, Bremgarten, Switzerland, assignor to Nestec S.A., Vevey, Switzerland

Filed May 25, 1988, Ser. No. 198,234

Claims priority, application Switzerland, Jun. 9, 1987, 2165/87

Int. Cl.[4] A23C *7/04, 9/15;* A23L *1/29*

U.S. Cl. 426—580 **6 Claims**

1. A process for the production of a sterilized liquid composition based upon acidic casein comprising:

preparing and mixing a 10% to 18% by weight aqueous suspension containing acidic casein and a 10% to 30% by weight aqueous suspension containing $Ca(OH)_2$ and containing a substance selected from a group consisting of KOH and NaOH for obtaining a solution having a pH below 6.5 and wherein the $Ca(OH)_2$ content is from 14 g/kg to 20 g/kg casein dry matter, and wherein when KOH is the substance, the KOH content is from 4 g/kg to 11 g/kg dry matter and wherein when NaOH is the substance, the NaOH content is from 2.5 g/kg to 8 g/kg casein dry matter;

heat-treating the solution;

cooling the heat-treated solution;

introducing and then homogenizing fats into the cooled solution;

introducing additives including carbohydrates into the homogenized solution for preparing a product mixture;

sterilizing the mixture;

homogenizing the sterilized mixture; and

packaging the homogenized mixture aseptically.

4,883,683

METHOD FOR PREPARATION OF SOLID FOODSTUFFS

Hiroyuki Sano, Kishiwada; Masatoshi Kizaki, and Yukiya Iwanaga, both of Sennan, all of Japan, assignors to Fuji Oil Company, Limited, Osaka, Japan

Continuation of Ser. No. 71,705, Jul. 8, 1987, abandoned. This application Dec. 16, 1988, Ser. No. 285,024

Claims priority, application Japan, Jul. 10, 1986, 61-163206

Int. Cl.[4] A23C *20/00;* A23J *1/20*

U.S. Cl. 426—582 **5 Claims**

1. A method for preparation of solid foodstuff which comprises providing an emulsion comprising soybean protein, a casein, oils and fats and water, adding an alkaline earth metal-type solidifying agent selected from the group consisting of calcium sulfate, calcium chloride, calcium lactate, magnesium sulfate and magnesium chloride to said emulsion, and reacting said solidifying agent with said emulsion under heating,

said alkaline earth metal-type solidifying agent being used in an amount of 0.05 to 5% calculated as the amount of the alkaline earth metal based on said soybean protein,

the ratio of said soybean protein to said casein being in a range of approximately 1//5to 3/1,

said oils and fats being used in an amount of 0.3 to 1.7 parts per 1 part of the total amount of said soybean protein and casein,

said soybean protein having a crude protein content of at least 60%, and

said water being used in said emulsion in an amount of 30 to 60%.

4,883,684

FUNCTIONAL HARDSTOCK FAT COMPOSITION

David K. Yang, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jul. 1, 1988, Ser. No. 213,959

Int. Cl.[4] A23D *5/00*

U.S. Cl. 426—607 **8 Claims**

1. A plastic shortening composition comprising:

(a) from about 65% to about 95% of a triglyceride fat or oil base stock having an iodine value of less than 150; and

(b) from about 5% to about 35% of a beta prime tending hardstock with a melting point between 35° C. and 70° C., said hardstock consisting essentially of:

(i) from about 14% to 100% of a triglyceride esterified with a $C_{18:2}$ fatty acid and the remaining fatty acids are selected from the group of C_{18}–C_{26} saturated fatty acids; and

(ii) from about 86% to 0% of a mixture of triglycerides esterified with one or more saturated or unsaturated C_{18}–C_{26} fatty acids.

4,883,685

MESO-ERYTHRITOL HARD CANDY AND PROCESS FOR PRODUCING THE SAME

Tsutomu Kondou, Sagamihara, Japan, assignor to Mitsubishi Kasei Corporation and Nikken Chemicals Company, Limited, both of, Japan

Filed Aug. 11, 1988, Ser. No. 231,220

Claims priority, application Japan, Aug. 14, 1987, 62-202820

Int. Cl.[4] A23G *3/00*

U.S. Cl. 426—658 **17 Claims**

1. A hard candy comprising 30% to 80% by weight of meso-erythritol based on said candy, and saccharides taken from the class consisting of sugar alcohols other than meso-erythritol and sugars as the main components.

4,883,686

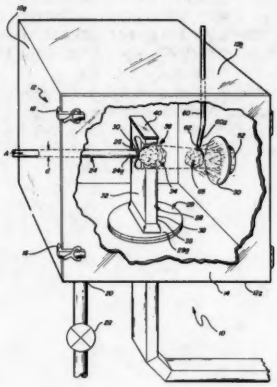
METHOD FOR THE HIGH RATE PLASMA DEPOSITION OF HIGH QUALITY MATERIAL

Joachim Doehler, Union Lake; Stephen J. Hudgens, Southfield; Stanford R. Ovshinsky, Bloomfield Hills; Buddie Dotter II, Utica; Lester R. Peedin, Oak Park; Jeffrey M. Krisko, Highland, and Annette Krisko, Highland, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed May 26, 1988, Ser. No. 199,062

Int. Cl.[4] B05D *3/06*

U.S. Cl. 427—38 **41 Claims**



1. A method of fabricating high quality thin films at a relatively high rate of deposition, said method comprising the steps of:

providing an enclosure;

maintaining the interior of said enclosure at a sub-atmospheric background pressure;

introducing an energy transferring gas into the interior of said enclosure through at least one aperture formed in a first conduit;

creating a choke condition adjacent the aperture in said first conduit so as to provide a localized high pressure of energy transferring gas flowing therethrough;

activating said energy transferring gas in an activation region so as to form a high density plume of activated species from said energy transferring gas;

introducing a precursor deposition gas into the interior of said enclosure through a second conduit; the point of introduction of said precursor deposition gas from said second conduit into said enclosure being spacedly disposed relative to said activation region, whereby collisions of said high density of activated species with said precursor deposition gas define a collision region in which a high density of energized deposition species of said precursor deposition gas are generated;

operatively disposing substrate means interiorly of said enclosure for depositing energized deposition species of said precursor deposition gas thereupon; said substrate means spacedly positioned from said activation region a distance sufficient to substantially prevent electron damage; and

maintaining a substantial pressure differential between the pressure of said energy transferring gas in said first conduit and the background pressure in said enclosure, said pressure differential being sufficient to, provide for the activation of a high density of activated species of said energy transferring gas, whereby high quality thin film material of desired deposition species is deposited onto said substrate at a rate greater than about 5 Angstroms per second.

4,883,687

FLUID BED PROCESS FOR PRODUCING POLYSILICON

Marcelian F. Gautreaux, and Robert H. Allen, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 4,116, Jan. 16, 1987, Pat. No. 4,820,587, which is a continuation-in-part of Ser. No. 899,906, Aug. 25, 1986, abandoned. This application Dec. 27, 1988, Ser. No. 290,584

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.[4] B05D *7/00;* **C01B** *33/02*

U.S. Cl. 427—213 **2 Claims**

1. A process comprising the step of intimately contacting:

(a) a bed of particles of silicon maintained:

(i) in a vertically disposed reaction zone, and

(ii) at a reaction temperature higher than the thermal decomposition temperature of silane with;

(b) silane contained in a first and second decomposition gas, each of said deposition gases being introduced into said bed of particles at a flow rate sufficient to maintain said bed in a fluidized state within said reaction zone, said first deposition gas being introduced for a first deposition period and being a mixture of about 10 to about 15 mole percent silane in hydrogen, said second deposition gas being introduced for a second deposition period beginning substantially immediately after the termination of said first deposition period, and being a mixture of about 1 to 5 mole percent silane in hydrogen, said process being further characterized in that said first

deposition period is from about 2 to about 5 times as long in time duration as said second deposition period, such that polysilicon in the form of approximately spherical particles is produced, said particles having

(i) a size distribution of from 400 to 100 microns;

(ii) an average size of 650 to 750 microns;

(iii) a boron content of no more than 0.25 ppba;

(iv) a phosphorus content of no more than 0.19 ppba;

(v) a carbon content of no more than 0.33 ppm; and

(vi) a surface dust content less than about 0.08 weight percent bonded to said particles by a silicon layer in the range of 0.1 to about 5 microns in thickness.

4,883,688

METHOD FOR PRODUCING CHROMATOGRAPHIC DEVICES HAVING MODIFIED EDGES

Thomas M. Houts, Mountain View, and Edwin F. Ullman, Atherton, both of Calif., assignors to Syntex (U.S.A) Inc., Palo Alto, Calif.

Division of Ser. No. 591,155, Mar. 16, 1984, Pat. No. 4,757,004. This application Jul. 5, 1988, Ser. No. 215,020

Int. Cl.[4] B05D *5/00, 3/12*

U.S. Cl. 427—285 **3 Claims**

1. A method for producing a device comprised of chromatographic material having a longitudinal edge, which comprises introducing a pluality of indentations along the longitudinal edge of said material, the number, configuration, and dimensions of said indentations being sufficient to render the front of a component traversing said chromatographic material substantially flat or convex.

2. A method for producing a device comprised of chromatographic material having a longitudinal edge, which comprises introducing a chemical substance along the longitudinal edge of said material, said substances being capable of reducing the rate of migration of a component traversing said chromatographic material, the amount of said substance being sufficeint to render the front of a component traversing said chromatographic material substantially flat or convex.

4,883,689

METHOD OF PRESERVING WOOD WITH LANTHANIDE DERIVATIVES

Peter S. Gradeff, Pottersville, N.J., assignor to Rhone Poulenc, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 121,623, Nov. 17, 1987, which is a continuation-in-part of Ser. No. 17,159, Feb. 20, 1987, Pat. No. 4,743,473. This application Nov. 4, 1988, Ser. No. 267,009

Int. Cl.[4] B05D *1/18, 3/00*

U.S. Cl. 427—297 **30 Claims**

16. A method for preserving wood comprising the steps of:

(a) subjecting wood to a vacuum;

(b) introducing a composition comprising a solution comprising an organic solvent and one or more lanthanide derivatives and contacting the wood and composition for a period of time sufficient to bond the lanthanide to the wood.

4,883,690

METHOD AND APPARATUS FOR COATING ELONGATE MEMBERS

Neil A. Carter, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Jun. 6, 1988, Ser. No. 202,332

Int. Cl.[4] B29C *41/20;* **B05C** *1/02, 5/02*

U.S. Cl. 427—430.1 **15 Claims**

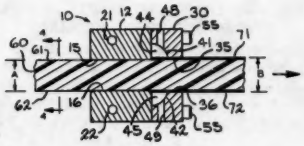
1. Apparatus for applying a coating to an advancing elongate member having a constant cross-sectional shape comprising:

a housing having a guideway closely conforming to the cross-sectional size and shape of the uncoated elongate member over at least a portion thereof, the guideway being comprised of a plurality of guide surfaces; and

a collar in abutting engagement with the housing, the collar having a passageway in communication with the guideway of the housing, and the collar passageway being comprised of a plurality of passageway surfaces corresponding to the guide surfaces of the housing guideway;

a first passageway surface being coplanar with the corresponding guide surface of the housing so that substantially none of the coating is applied to the portion of the elongate member in contact with said first passageway surface;

a second passageway surface being offset from the plane of the corresponding guide surface of the housing so that the



coating is applied to the portion of the elongate member in contact with said second passageway surface, where the amount of offset of said second passageway surface is substantially equal to the desired coating thickness to be applied to the portion of the elongate member in contact with said second passageway surface; and

a transverse recess in said second passageway surface, said transverse recess being adapted to be supplied with the coating material, said transverse recess and second passageway surface being adapted to cooperate to continuously apply the coating to the desired portion of elongate member at the desired thickness as the elongate member continuously advances through the apparatus.

4,883,691

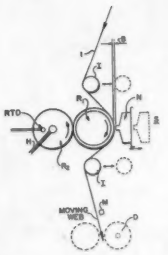
METHOD OF AND APPARATUS FOR MAINTAINING UNIFORM HOT MELT COATINGS ON THERMALLY SENSITIVE WEBS BY MAINTAINING DIMENSIONAL STABILITY OF SILICONE AND RUBBER-LIKE WEB BACK-UP ROLLS

Frederic S. McIntyre, Wellesley, Mass., assignor to Acumeter Laboratories, Inc., Marlborough, Mass.

Division of Ser. No. 53,386, May 22, 1987, Pat. No. 4,805,554. This application Nov. 14, 1988, Ser. No. 270,215

Int. Cl.[4] B05D *1/26*

U.S. Cl. 427—434.2 **6 Claims**



1. A method of maintaining uniform hot melt coatings on thermally sensitive webs by maintaining the dimensional stability of silicone and rubber-like web back-up rolls that would otherwise be subject to dimensional variations as hot melt is

deposited from a nozzle upon the front of the web, with attendant nozzle-to-web spacing variation as well, the method comprising, continuously contacting the surface of the back-up roll with a heat-conducting roll that, with increased surface temperature of the back-up roll, can directly remove heat as a heat sink from the back-up roll, and with decrease in back-up roll surface temperature can directly contact-heat the surface of the back-up roll; sensing variations in heat of the surface of the back-up roll in response to the deposition of hot melt from the nozzle onto the front of the web and the transfer of heat from the back-up roll to the back of the web that would tend to introduce web coating variations and degradation; and controlling the temperature of the heat-conducting roll in response to such sensing to control the direct transfer of heat between the back-up and heat-conducting rolls and vice versa so as to maintain the substantial dimensional stability of the back-up roll and of the nozzle-to-web spacing.

4,883,692

AROMATIC FOAM-PLASTIC DECORATIVE OBJECT

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Filed Jan. 13, 1989, Ser. No. 296,683
Int. Cl.[4] A61L *9/04*; B42D *15/02*
U.S. Cl. 428—16 **10 Claims**

1. An aromatic, foam-plastic, decorative, three-dimensional article comprising:

(a) an envelope configured to assume the contoured three-dimensional form of a decorative object, said envelope forming a mold cavity and having a port therein to admit a charge of foam-forming mixture having a liquid fragrance dispersed therein which expands under gas pressure to ill said cavity and conform to the contours of the envelope, aid envelope having minute apertures therein to relieve aid gas; and

(b) a foam-plastic object formed in situ in the cavity from said mixture admitted through said port and conforming to the contours of the envelope, aid object exuding said fragrance and said envelope being at least partially transparent to expose the object.

4,883,693

HEAT-SHRINKABLE LAMINATE TUBULAR FILM

Masaki Ohya, and Yoshiharu Nishimoto, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 675,307, Nov. 27, 1984, Pat. No. 4,732,795. This application Dec. 9, 1987, Ser. No. 130,528
Claims priority, application Japan, Dec. 2, 1983, 58-228116
The portion of the term of this patent subsequent to Mar. 22, 2005, has been disclaimed.
Int. Cl.[4] B32B *27/08, 27/34*
U.S. Cl. 428—34.9 **7 Claims**

1. A coextruded, biaxially stretched and laminated heat-shrinkable tubular film, comprising:

(1) a gas-barrier layer of a copolymer of vinylidene chloride having a thickness of not less than 6 μm, which is not more than 30% of the total thickness of the coextruded, biaxially stretched and laminated heat-shrinkable tubular film,

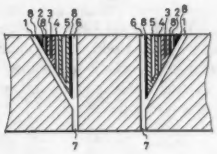
(2) outer layers prepared from at least one polymer selected from the group consisting of:

(i) a copolymer of ethylene and vinyl acetate having a crystal melting point ranging from 80° to 103° C.,

(ii) a linear low-density polyethylene having a crystal melting point ranging from 110 to 130° C.,

(iii) a mixture of more than 0% and not more than 40% by weight of a linear-low density polyethylene having a crystal melting point ranging from 110° to 130° C., and not less than 60% and less than 100% by weight of a copolymer of ethylene and vinyl acetate having a crystal melting point ranging from 80° to 103° C., and

(iv) a mixture of more than 40% by weight and less than 100% by weight of a linear low-density polyethylene of a density in the range of 0.915 to 0.930 and more than 0% by weight and less than 60% by weight of a copolymer of ethylene and vinyl acetate of a crystal melting point in the range of 80° to 103° C.,



said outer layers having a thickness of 40 to 92% of the total thickness of the coextruded, biaxially stretched and laminated heat-shrinkable tubular film,

(3) at least one intermediate layer of a polyamide or a thermoplastic polyester, both of which show a crystal melting point of not more than 240° C., said intermediate layer having a thickness of 5 to 40% of the total thickness of the coextruded, biaxially stretched and laminated heat-shrinkable tubular film, and

(4) adhesive layers disposed between all or certain polymer layers, each adhesive layer having a thickness of 0.5 to 5.0 μm, and

the total thickness of the coextruded, biaxially stretched and laminated heat-shrinkable tubular film being in the range of 25 to 110 μm

said coextruded, biaxially stretched and laminated heat-shrinkable tubular film being produced by laminating and coextruding the copolymer of vinylidene chloride, the polyolefin, polyamide or the thermoplastic polyester and the adhesive material, cooling, heating and stretching the resultant laminated tubular film.

4,883,694

METHOD OF FORMING FLEXIBLE PACKAGES AND NOVEL FLEXIBLE PACKAGES

Balasubramaniam Ramalingam, Columbus, Ohio, assignor to Century Adhesives Corp., Columbus, Ohio

Division of Ser. No. 258,460, Oct. 17, 1988, and a continuation-in-part of Ser. No. 134,790, Dec. 18, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 322,351
Int. Cl.[4] C09J *3/16*
U.S. Cl. 428—35.2 **13 Claims**

1. A flexible package comprising a joint between a plurality of sections of flexible substrate bonded together by an layer of adhesive comprising a chain extended urethane polymer containing peroxy carbamyl groups.

6. The flexible package of claim 1 which is a retortable pouch.

4,883,695

OPERATION TABLE COVER

Albert Weimar, Rosenheim-Pang, Fed. Rep. of Germany, assignor to SENGEWALD Klinikprodukte GmbH, Rohrdorf/-Thansau, Fed. Rep. of Germany

Filed May 2, 1988, Ser. No. 191,166

Claims priority, application Fed. Rep. of Germany, May 12, 1987, 3715691

Int. Cl.[4] B65D *30/00;* B31B *1/64*

U.S. Cl. 428—35.2 4 Claims

1. An operation table cover, comprising a hose of a thermoplastic foil material, said hose having a bottom end which is closed and an opposite head end with which it is slippable over a supporting surface of an operation table, said hose having two walls each having two lateral edges, said lateral edges of one of said walls being connected with said lateral edges of the other of said walls by first welding seams, said hose having an upper surface; a coating of an absorptive non-woven fabric provided on said upper surface of said hose; and two strips overlapping said head end of said hose at its two opposite sides, said hose having a predetermined width, said overlapping strips having a width which in an unstretched condition of said overlapping strips is greater than the width of said hose, said strips having two lateral edges, said two lateral edges of one of said strips being connected with said two lateral edges of the other of said strips by two second welding seams which are separate from said first welding seams and are located laterally outside of said first welding seams.

4,883,696

LAMINATE

Teruo Iwanami, Ibaraki; Takamasa Moriyama, Suita, and Kuniyoshi Asano, Hirakata, all of Japan, assignors to Nippon Gohsei Kaguku Kogyo Kabushikis Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 115,041, Oct. 30, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 273,571

Claims priority, application Japan, Nov. 1, 1986, 61-261037

Int. Cl.[4] B32B *27/08;* C08L *29/04*

U.S. Cl. 428—35.4 8 Claims

1. A laminate comprising a layer of a composition (A) consisting essentially of 100 parts by weight of a hydrolyzed ethylene-vinyl acetate copolymer having an ethylene content of 20 to 55 by mole and a degree of hydrolysis of at least 90% by mole and 1 to 100 parts by weight of a thermoplastic polyester having a glass transition termperature of −50° to 25° C. and a heat of fusion of not more than 30 joules/g, the acid component of said thermoplastic polyester being a mixture of 20 to 70% by mole of an aromatic dicarboxylic acid of at least one of terephthalic acid and isophthalic acid and 80 to 30% by mole of an aliphatic dicarboxylic acid of at least one of adipic acid and sebasic acid, and the glycol component of said thermoplastic polyester being an alkylene glycol having 2 to 6 carbon atom; and a layer of a composition (B) comprising at least one polymer selected from the group consisting of a polyolefin, a polystyrene, a polyvinyl chloride, a polyamide, a polycarbonate and a polyester having a glass transition temperature of not less than 30° C.

4,883,697

THERMOPLASTIC IN-MOLD LABELING LABEL STRUCTURE FOR DEFORMABLE THERMOPLASTIC PACKAGES

Arthur H. Dornbusch; Roger E. Schanzle, both of Cincinnati, Ohio, and Irvin L. Brazier, West Milwaukee, Wis., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 67,771, Jul. 8, 1987, abandoned, which is a continuation-in-part of Ser. No. 889,031, Jul. 23, 1986, abandoned. This application Jul. 22, 1988, Ser. No. 223,055

Int. Cl.[4] B32B *27/08;* B65D *25/34*

U.S. Cl. 428—35.7 11 Claims

1. A non-paper, flexible, resilient, multilayer label adapted for application to a deformable thermoplastic package by in-mold labeling procedures, said label comprising:

(a) An elastic, machineable, thermoplastic, stress-compensating stratum which comprises an unfoamed film having a Young's Modulus less than about 2800 Kg/cm^2, said stress-compensating stratum having an upper and lower surface and a thickness in the range of from about 0.019 mm to about 0.076 mm;

(b) a thermoplastic, low temperature heat-activated sealant layer generally coextensive with and laminated to the lower surface of said stress-compensating stratum; and

(c) a thermoplastic label stratum which has a Young's Modulus greater than about 7030 Kg/cm^2 and a smooth label surface, said label stratum being laminated to the upper surface of said stress-compensating stratum and having a thickness in the range of from about 0.0064 mm to about 0.025 mm.

4,883,698

MULTILAYER FILM CONTAINING A BIAXIALLY ORIENTED POLYPROPYLENE FILM

Lothar Bothe, Mainz; Guenther Crass, Taunsstein-Wehen; Siegfried Janocha, Weisbaden, and Gunter Schloegl, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 11, 1988, Ser. No. 141,728

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1987, 3701307

Int. Cl.[4] B65D *65/40;* B32B *27/08, 27/32*

U.S. Cl. 428—35.9 17 Claims

1. A multilayer film comprising:

a biaxially oriented polypropylene film as a base layer;

a first surface layer comprising a metal layer deposited by metallization on a surface which is free from organic additives, such as lubricants or antistatic agents, and which has been exposed to a corona discharge before the metallization, wherein said surface is a surface of said base layer or a surface of an intermediate layer; and

a second surface layer comprising a heat-sealing layer containing an additive combination comprising an inorganic pigment and a polydiorganosiloxane, wherein said heat sealing layer is applied on the surface of said base layer

opposite said first surface layer and comprises an ethylene, ethylene/propylene, ethylene/butylene propylene/butylene or ethylene/propylene/butylene polymeric material or a mixture of said polymeric materials, and wherein said inorganic pigment comprises aluminum silicate in platelet form.

4,883,699

POLYMERIC ARTICLE HAVING HIGH TENSILE ENERGY TO BREAK WHEN HYDRATED

Lawrence M. Aniuk, Santa Clara; Ronald L. Dieck, Irving, and Dwayne Hardy, San Mateo, all of Calif., assignors to Menlo Care, Inc., Palo Alto, Calif.

Continuation of Ser. No. 780,543, Sep. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 653,390, Sep. 21, 1984, abandoned. This application Jan. 23, 1987, Ser. No. 8,117

Int. Cl.[4] B27N *5/02*

U.S. Cl. 428—36.9 **30 Claims**

1. An article, suitable for use as a body implant, having been formed from a multiple phase polymeric composition comprising:

(a) a first phase which is continuous and comprises a substantially non-hydrophilic polymeric component capable of absorbing water in an amount of no more than about 30% by weight based on the weight of the non-hydrophilic polymer; and

(b) a second phase which comprises a hydrophilic polymeric component capable of absorbing at least about 50% water, by weight based on the weight of the hydrophilic polymer;

wherein said article (i) is capable of absorbing water to an extent that it softens with a softening ratio of at least about 2:1 or swells with a swelling ratio of at least about 1.3:1; and (ii) has an energy to break of at least about 700 N-cm/cm^3 and a 2.5% Secant modulus of less than about 7,000 N/cm^2, when substantially completely hydrated.

4,883,700

COMPOSITE AND ARTICLE USING SHORT LENGTH FIBERS AT OBLIQUE ANGLES

G. A. Harpell, Morris Township, Morris County; H. L. Li, Parsippany; Y. D. Kwon, Mendhem, and D. C. Prevorsek, Morris Township, Morris County, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

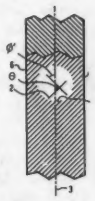
Filed Aug. 3, 1987, Ser. No. 81,073

Int. Cl.[4] B32B *5/12*

U.S. Cl. 428—113 **14 Claims**

1. A multilayer composite comprising a plurality of prepreg layers where each prepreg layer comprises an array of at least two coplanar fibrous elements, with each element having a longitudinal axis and comprising a plurality of unidirectional fibers embedded in a polymeric matrix, the fibers being at an angle of from 30° to 60° to the longitudinal axis of the element and up to eight inches in length.

12. A multilayer composite comprising a plurality of prepreg layers where each prepreg layer comprises a fibrous element having a longitudinal axis and comprising a plurality of unidirectional fibers embedded in a polymeric matrix, the fibers



being at an angle of from 30° to 60° to the longitudinal axis of the element and up to eight inches in length.

4,883,701

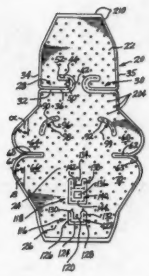
INFANT CAR SEAT LINER

Janice J. Rankin, and Marilyn M. Pearson, both of Portland, Oreg., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Apr. 29, 1988, Ser. No. 187,988

Int. Cl.[4] B32B *3/10*

U.S. Cl. 428—136 **26 Claims**



1. A disposable infant seat liner for car seats of the type having a pair of shoulder straps and at least one leg strap comprising:

a body of a disposable material having a longitudinal centerline and including an upper ;shoulder supporting section, a central section and a lower leg supporting section;

means defining at least two shoulder strap receiving slotways, the shoulder strap receiving slotways being positioned at opposite sides of the centerline of the upper shoulder supporting section;

means defining at least one leg strap receiving slotway in the lower leg supporting section; and

the body having first and second side edges and in which the central section of the body is enlarged relative to the upper end portion of the body and relative to a lower end portion of the lower leg supporting section of the body, the first and second side edges converging from the central section to the lower leg supporting section to provide a narrowing transition between these sections of the infant seat liner, the liner including a first inwardly directed slit extending inwardly from the first side edge of the central body section and a second inwardly directed slit extending inwardly from the second side edge of the central section of the body opposite to the first side edge, whereby the slits permit portions of the central section of the body adjacent to these slits to overlap one another when the body is positioned in an infant seat.

4,883,702

POLYPHENYLENE SULFIDE RESIN COMPOSITION USEFUL FOR PLATING

Masatoshi Sato; Kensuke Ogawara, and Noriaki Emura, all of Yamaguchi, Japan, assignors to Tosoh Corporation, Yamaguchi and Hodogaya Chemical Co., Ltd., Tokyo, both of, Japan

Continuation of Ser. No. 941,120, Dec. 12, 1986, abandoned.
This application May 23, 1988, Ser. No. 198,657
Claims priority, application Japan, Dec. 12, 1985, 60-277914
Int. Cl.[4] C08K *3/40, 3/10*
U.S. Cl. 428—141 4 Claims

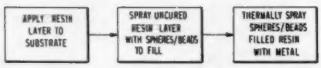
1. An article comprised of a polyphenylene sufide resin composition comprising 30 to 70% by weight of a polyphenylene sulfide resin, from 70 to 30% by weight of glass fibers, and from 1 to 10% by weight of potassium titanate fibers, the surface of said article having been etched by an etching solution.

4,883,703

METHOD OF ADHERING THERMAL SPRAY TO SUBSTRATE AND PRODUCT FORMED THEREBY

Louis M. Riccio, P.O. Box 81, DeVault, Pa. 19432, and Alexander A. Bosna, 135 Summit Rd., Malvern, Pa. 19355

Filed Aug. 29, 1988, Ser. No. 237,125
Int. Cl.[4] B32B *3/30, 5/18;* B05D *1/08, 1/36*
U.S. Cl. 428—142 2 Claims


APPLY RESIN LAYER TO SUBSTRATE
SPRAY UNCURED RESIN LAYER WITH SPHERES/BEADS TO FILL
THERMALLY SPRAY SPHERES/BEADS FILLED RESIN WITH METAL

1. A method of applying a coating to a substrate surface comprising:

forming a curable resin filled with micron-sized beads or spheres or other filler on the surface of said substrate and, prior to curing of said resin;

thermally spraying metal particles in a molten state upon the exposed surface of said micron-sized sphere or bead or other filler filled resin so as to cause the molten particles to shape themselves around the upper ones of said micron-sized spheres or beads and into the surface of the uncured resin to form undercuts or roughness in the resin layer;

thermally spraying metal particles in a molten state upon that surface to a desired thickness of said metal; and

curing the resin.

2. A metal coated surface made according to the method defined in claim 1.

4,883,704

CIRCUIT SUBSTRATE COMPRISING NITRIDE TYPE CERAMICS, METHOD FOR PREPARING IT, AND METALLIZING COMPOSITION FOR USE IN IT

Hideki Sato; Nobuyuki Mizunoya, both of Yokohama; Hironori Asai, Kawasaki; Kazuo Anzai, Tokyo, and Tsuyoshi Hatano, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 29, 1988, Ser. No. 174,902
Claims priority, application Japan, Mar. 30, 1987, 62-73989; Mar. 31, 1987, 62-76164; Mar. 31, 1987, 62-76165; Feb. 26, 1988, 63-43858
Int. Cl.[4] B32B *9/00*
U.S. Cl. 428—209 3 Claims

1. An aluminum nitride ceramic substrate comprising:

an aluminum nitride ceramic sintered sheet; a conductive metallized layer comprising at least one of the group consisting of molybdenum and tungsten formed on said aluminum nitride ceramic sintered sheet; and

a layer of a compound containing yttria and alumina at the interface between said aluminum nitride ceramic sintered sheet and said metallized layer and penetrating the metallized layer.

4,883,705

COMPOSITION FOR CERAMIC SUBSTRATE AND SUBSTRATE

Keiichi Kawakami; Mitsuo Takabatake, and Jiro Chiba, all of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Division of Ser. No. 44,738, May 1, 1987, Pat. No. 4,777,092.
This application Jul. 6, 1988, Ser. No. 215,528
Claims priority, application Japan, May 2, 1986, 61-101061; Nov. 11, 1986, 61-266702
Int. Cl.[4] B32B *9/00*
U.S. Cl. 428—209 9 Claims

8. The composition according to claim 6, wherein the glass powder consists essentially of from 40 to 47% by weight of SiO_2, from 2 to 7% by weight of Al_2O_3, from 2 to 7% by weight of MgO, from 2 to 7% by weight of CaO, from 22 to 28% by weight of BaO, from 1 to 18% by weight of PbO, from 12 to 20% by weight of ZnO, from 1 to 8% by weight of B_2O_3, from 0 to 4% by weight of TiO_2 plus ZrO_2 and from 0 to 3% by weight of Li_2O plus Na_2O plus K_2O.

4,883,706

THICK COMPOSITE POLYESTER FILMS

Pierre Grosjean, Sainte Foy les Lyon, France, assignor to Rhone-Poulenc Films, Courbevoie, France

Filed Dec. 23, 1987, Ser. No. 137,067
Claims priority, application France, Dec. 23, 1986, 86 18230
Int. Cl.[4] B32B *7/02, 27/08*
U.S. Cl. 428—215 16 Claims

1. A coextruded composite polyester film having a thickness greater than 40 micrometers, comprising a thick crystalline or semicrystalline polyester film substrate (A), said film substrate (A) having a coating (B) of a sulfonated copolyester adhesion primer on at least one of the face surfaces thereof, said sulfonated copolyester comprising at least 80 mol % of terephthalate recurring units and from 3 to 10 mol % of oxysulfonylated recurring units.

2. The composite polyester film as defined by claim 1, said coating(s) (B) having a thickness ranging from 0.3 to 10 micrometers.

4,883,707

HIGH LOFT NONWOVEN FABRIC

David D. Newkirk, Greer, S.C., assignor to James River Corporation, Richmond, Va.

Filed Apr. 21, 1988, Ser. No. 184,228
Int. Cl.[4] B32B *5/26, 7/10, 31/26*
U.S. Cl. 428—219 14 Claims

1. A nonwoven fabric having a basis weight in the range of 15–40 grams per square yard and suitable for use as coverstock that comprises

a soft carded web layer consisting essentially of thermoplastic fibers having an average denier of 3 or less, and

a lofty carded web layer consisting essentially of thermoplastic fibers having an average denier of 3 or greater,

wherein said webs contain sufficient thermoplastic bicomponent fiber to provide bonding within and between each of said

web layers and wherein the thermoplastic bicomponent fiber in said lofty layer is flat-crimped.

4,883,708

METAL FOIL COVERED LAMINATE

Kenichi Kariya; Masayuki Noda; Takahiro Yamaguchi, and Katsuji Takahashi, all of Hikone, Japan, assignors to Shin-Kobe Electric Machinery Co., Ltd., Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,685

Claims priority, application Japan, Jun. 4, 1987, 62-140188; Jun. 4, 1987, 62-140189; Feb. 26, 1988, 63-43445

Int. Cl.[4] B32B *15/08, 17/06*

U.S. Cl. 428—263 **7 Claims**

1. A metal foil covered laminate comprising:

a sheet-like base formed of at last two of meta-aramic fiber, polyethylene terephthalate fiber and glass fiber and impregnated with preliminary condensation material formed by acrylonitrile/butadiene copolymer having terminal carboxyl groups esterified with apoxy resin having more than two epoxy groups;

and a metal foil covering on at least one face of said sheet-like base.

4,883,709

COMPOSITE NON-WOVEN FABRIC AND PROCESS FOR PREPARING SUCH NON-WOVEN FABRIC

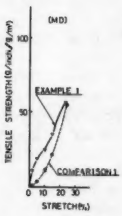
Satoshi Nozaki, Ehime; Shigeo Imai, Kawanoe; Makoto Ishigami, Tokyo, and Katsushi Tomida, Kanonji, all of Japan, assignors to Uni-Charm Corporation, Ehime, Japan

Filed Oct. 24, 1988, Ser. No. 261,426

Claims priority, application Japan, Jun. 21, 1988, 63-152985

Int. Cl.[4] D04H *1/58*

U.S. Cl. 428—288 **18 Claims**



1. A composite nonwoven fabric comprising a nonwoven fabric substrate composed of first staple fibers and second short fibers entangled on and in said nonwoven fabric substrate under action of fluid, characterized by that said substrate comprising a fiber-entangled nonwoven fabric stretched in cross direction by 20 to 200% and that traces of fluid jets are formed on a layer of said fabric comprising predominately the second short fibers, which are more closely spaced from one another than traces of the fluid jets formed on a layer of said fabric comprising predominately the first staple fibers.

4,883,710

MAGNETO-OPTICAL RECORDING MEDIUM

Hajime Machida, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 28, 1987, Ser. No. 113,489

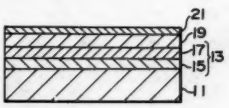
Claims priority, application Japan, Oct. 28, 1986, 61-256424; Oct. 28, 1986, 61-256425

Int. Cl.[4] G11B *9/00*

U.S. Cl. 428—336 **16 Claims**

1. A magneto-optical recording medium comprising a substrate, and a magnetic layer supported on said substrate, said magnetic layer comprising:

a first magnetic layer comprising a magnetic oxide with perpendicular magnetic characteristics, having a saturation magnetization Ms of 100 Gauss or less and a coercive force Hc_1 of 1 KOe or more, and



a second magnetic layer adjacent to said first magnetic layer comprising a magnetic oxide having a thermal conductivity x of less than 0.3 cal/cm.sec.° C. and a light absorption coefficient α of 5×10^3 cm^{-1} or more.

4,883,711

MAGNETIC RECORDING MEDIUM

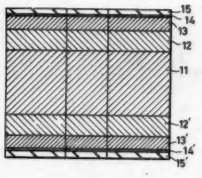
Yoshihiro Shiroishi, Hachiouji; Sadao Hishiyama, Sayama; Hiroyuki Suzuki, Kawasaki; Tomoyuki Ohno; Yoshibumi Matsuda, both of Kokubunji; Kazumasa Takagi, Tokyo; Norikazu Tsumita, Kanagawa; Yasushi Kitazaki, Odawara; Masaki Ohura, Odawara, and Sadanori Nagaike, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 15, 1987, Ser. No. 133,357

Claims priority, application Japan, Dec. 24, 1986, 61-306419

Int. Cl.[4] G11B *5/64*

U.S. Cl. 428—336 **9 Claims**



1. A magnetic recording medium having a magnetic layer over a substrate , a non-magnetic overcoat layer over said magnetic layer and a non-magnetic intermediate layer disposed between said magnetic layer and said non-magnetic overcoat layer, wherein said non-magnetic intermediate layer is made of an alloy substantially composed of at least one element selected from the group consisting of Zr, Hf and Ti and contains at least one element selected from the group consisting of Pt, Pd, Rh, Ir, Ru and Os in an amount from 0.01 to 1.0 at %.

4,883,712

CARBON FIBER CORD FOR RUBBER REINFORCEMENT

Hiroyasu Ogawa; Yasuo Kogo, both of Shizuoka; Shuji Takahashi, and Yasuo Suzuki, both of Kanagawa, all of Japan, assignors to Toho Rayon Co., Ltd. and The Yokohama Rubber Co., Ltd., both of Tokyo, Japan

Filed Dec. 24, 1986, Ser. No. 945,994

Claims priority, application Japan, Dec. 24, 1985, 60-289306; Dec. 24, 1985, 60-289308

Int. Cl.[4] B32B *9/00*; D02G *3/00*

U.S. Cl. 428—367 **13 Claims**

1. A carbon fiber cord for rubber reinforcement comprising a carbon fiber bundle having a cured coating thereon provided by coating and curing a resin composition comprising a mixture of 100 parts by weight of a butadiene-acrylonitrile copolymer having a carboxyl group on at least both terminals of the molecule of the copolymer and from 5 to 40 parts by weight of an epoxy resin, or a reaction mixture obtained therefrom, and a curing agent for the epoxy resin in an amount of from 5 to

50% by weight, based on the total weight of the carbon fiber bundle and the coating, and further having a coating thereon of a mixture or a phenol-formalin-rubber latex type adhesive for

rubber in an amount of from 0.5 to 5% by weight, based on the total weight of the carbon fiber bundle and the resin composition coated thereon.

4,883,713

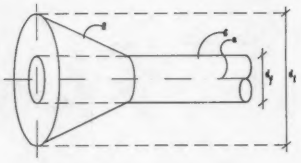
MOLDABLE MATERIAL REINFORCEMENT FIBERS WITH HYDRAULIC OR NON-HYDRAULIC BINDER AND MANUFACTURING THEREOF

Xavier P. Destree, and Angelo A. Lazzari, both of Brussels, Belgium, assignors to Eurosteel s.a., Brussels, Belgium

Continuation-in-part of Ser. No. 857,645, Apr. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 589,117, Feb. 22, 1984, abandoned. This application Dec. 16, 1987, Ser. No. 133,546

Int. Cl.[4] **B32B** *15/00*; **E04C** *5/00*

U.S. Cl. 428—397 **1 Claim**



1. A reinforcing fiber for use in reinforcing a moldable matrix material, comprising:

an elongated cylindrical steel body having opposite ends, and a longitudinal axis, and a head at each end thereof; said heads being substantially symmetrical with said axis and being substantially conically shaped, and extending longitudinally and radially outwardly from the ends thereof to create a substantially conically shaped surface, whereby the tangent at any point on said conically-shaped surface forms an angle with said axis between 20° and 60°; said heads being formed by mechanically deforming the ends of said elongated cylindrical steel body.

4,883,714

INK COMPOSITIONS AND PREPARATION

Rebecca R. Stockl; Kenneth R. Barton, and Melvin A. Caldwell, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 50,645, May 18, 1987, abandoned. This application Jan. 9, 1989, Ser. No. 295,086

Int. Cl.[4] **C09D** *11/10*

U.S. Cl. 428—412 **15 Claims**

1. A composition useful as a printing ink or concentrate thereof comprising a substantially homogeneous system of the components:

(1) from about 4 to about 80 weight % of polymeric material of at least one linear, water-dissipatable polymer having carbonyloxy linking groups in the linear molecular structure wherein up to 80% of the linking groups may be carbonylamido linking groups, the polymer having an inherent viscosity of from about 0.1 to about 1.0 measured in a 60/40 parts by weight solution of phenol/ tetrachloroethane at 25° C. and at a concentration of 0.25 gram of polymer in 100 ml of the solvent, the polymer containing substantially equimolar proportions of carboxylic acid equivalents (100 mole percent) to hydroxy and amino equivalents (100 mole percent), the polymer comprising the reaction products of (a), (b), (c) and (d) from the following reactants or ester forming or esteramide forming derivatives thereof;

(a) at least one difunctional dicarboxylic acid;

(b) from about 4 to about 25 mole percent, based on a total of all acid, hydroxyl and amino equivalents being equal to 200 mole percent, of at least one difunctional sulfomonomer containing at least one metal sulfonate group attached to an aromatic or cycloaliphatic nucleus wherein the functional groups are hydroxy, carboxyl or amino;

(c) at least one difunctional reactant selected from a glycol or a mixture of a glycol and diamine having two —NRH groups, the glycol containing two —CH_2—OH groups of which (1) at least 15 mole percent based on the total mole percent of hydroxy or hydroxy and amino equivalents, is a poly(ethylene glycol) having the structural formula

$$H(OCH_2—CH_2)_nOH,$$

n being an integer of from 2 to about 20, or (2) of which from about 0.1 to less than about 15 mole percent based on the total mole percent of hydroxy or hydroxy and amino equivalents, is a poly(ethylene glycol) having the structural formula

$$H(OCH_2—CH_2)_nOH,$$

n being an integer of between 2 and about 500, and with the proviso that the mole percent of said poly(ethylene glycol) within said range is inversely proportional to the quantity of n within said range; and

(d) from none to at least one difunctional reactant selected from a hydroxycarboxylic acid having one —C(R-)$_2$—OH group, an aminocarboxylic acid having one —NRH group, and an amino-alcohol having one —C(R)$_2$—OH group and one —NRH group, or mixtures of said difunctional reactants;

wherein each R in the (c) or (d) reactants is a H atom or an alkyl group of 1 to 4 carbon atoms;

(2) from about 1 to about 60 weight % of pigment material;

(3) from substantially none to about 90 weight % of water; and

(4) from about 0.05 to about 30.0 weight % of polyvinyl alcohol,

wherein said ink, when printed by a flexographic process onto polyethylene having a surface energy of about 37–39 dynes/cm, has improved printability relative to a control ink without polyvinyl alcohol such that said ink has an increase in optical density relative to the control ink on said polyethylene of at least 100% wherein

$$\text{increase in optical density} = \frac{(\text{optical density of ink} - \text{optical density of control ink})}{\text{optical density of control ink}} \times 100.$$

6. The composition of any one of claims 1-5 wherein the pigment is one or a mixture of the following color index materials: C.I. Pigment Yellow 17; C.I. Pigment Blue 27; C.I. Pigment Red 49:2; C.I. Pigment Red 81:1; C.I. Pigment Red 81:3; C.I. Pigment Red 81:x; C.I. Pigment Yellow 83; C.I. Pigment Red 57:1; C.I. Pigment Red 49:1; C.I. Pigment Violet 23; C.I. Pigment Green 7; C.I. Pigment Blue 61; C.I. Pigment Red 48:1; C.I. Pigment Red 52:1; C.I. Pigment Violet 1; C.I.

Pigment White 6; C.I. Pigment Blue 15; C.I. Pigment Yellow 12; C.I. Pigment Blue 56; C.I. Pigment Orange 5; C.I. Pigment Black 7; C.I. Pigment Yellow 14; C.I. Pigment Red 48:2; and C.I. Pigment Blue 15:3.

11. The composition of claim 6 coated onto a substrate selected from metal foil, newsprint, bleached and unbleached Kraft paper, clay coated paper, glass, calendered paper, stainless paper, paper board, and films or other substrates of polyester, polycarbonate, cellulose ester, regenerated cellulose, poly(vinylidiene chloride), polyamide, polyolefin, or polystyrene.

4,883,715
ELASTIC ROTATABLE MEMBER

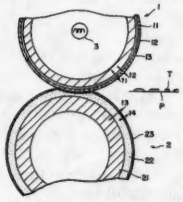
Tsukasa Kuge, Tokyo; Masahiro Goto, Kawasaki, and Isamu Sakane, Ohtsu, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo and Kabushiki Kaisha I.S.T., Ohtsu, both of, Japan

Division of Ser. No. 831,729, Feb. 21, 1986, Pat. No. 4,804,579. This application Jan. 13, 1988, Ser. No. 143,185

Claims priority, application Japan, Feb. 28, 1985, 60-39063; Apr. 12, 1985, 60-78646; Apr. 12, 1985, 60-78647; Oct. 12, 1985, 60-229020

Int. Cl.[4] B32B *27/28, 27/20;* **F27B** *7/28;* **B65H** *27/00*

U.S. Cl. 428—421 **15 Claims**



1. A roller for fixing an image, comprising:

a core member;

an elastic rubber layer on said core member;

at least two fluorine resin layers on said elastic layer, said resin layers being provided by sintering unsintered fluorine resin, the outside one of said resin layers being free of filler material.

4,883,716
METHOD FOR MANUFACTURE OF CAST FLUOROPOLYMER-CONTAINING FILMS AT HIGH PRODUCTIVITY

John A. Effenberger, Bedford; Keith G. Koerber, Goffstown, both of N.H.; Michael N. Latorra, North Palm Beach, and John V. Petriello, Palm Beach Gardens, both of Fla., assignors to Chemical Fabrics Corporation, Merrimack, N.H.

Filed Aug. 1, 1988, Ser. No. 226,614

Int. Cl.[4] B32B *7/02;* **B29C** *41/28, 41/32;* **C08F** *114/18*

U.S. Cl. 428—421 **12 Claims**

1. A fluoropolymeric film comprising at least one fluoropolymer-containing layer formed by

(a) preparing an aqueous dispersion comprising a fluoropolymer;

(b) dipping a carrier belt through the dispersion such that a coating of the dispersion is formed on the carrier belt;

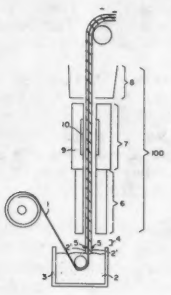
(c) passing the coated carrier belt through a metering device to remove excess dispersion;

(d) drying the metered coated carrier belt to remove the water from the dispersion;

(e) heating the dried coated carrier belt to a temperature sufficient to consolidate the dispersion;

(f) cooling the consolidated coated carrier belt; and

(g) stripping the consolidated fluoropolymeric film from the carrier belt, wherein the carrier belt is formed from a material of low thermal mass having chemical and dimensional stability at the consolidiation temperature of the dispersion and a work of adhesion that does not exceed the yield strength of the consolidated fluoroplymeric film.



4,883,717
VIBRATION-DAMPING MATERIAL

Shuji Kitamura, Nagaokakyo; Takuzo Okumura, Tokyo; Yoshio Tadokoro; Hiroo Toya, both of Ibaraki; Yoshiaki Togawa, Kyoto; Toshitsugu Kikuchi, Ibaraki; Tadayuki Ohmae, Chiba; Mitsuyuki Okada, Ichihara; Minoru Nishihara, Kyoto; Toshiaki Shiota, Takatsuki, and Hiroyuki Nagai, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited and Sumitomo Metal Industries, Ltd., both of Osaka, Japan

Continuation of Ser. No. 784,031, Oct. 4, 1985, abandoned. This application Dec. 14, 1987, Ser. No. 133,238

Claims priority, application Japan, Oct. 11, 1984, 59-213787; Oct. 11, 1984, 59-213788; Oct. 13, 1984, 59-215007

Int. Cl.[4] G10K *11/16;* **B60R** *13/08;* **B32B** *15/08;* **F16F** *1/36*

U.S. Cl. 428—458 **36 Claims**

1. A vibration-damping material consisting of two metal plates and a vibration-damping layer formed of thermoplastic resin interposed between the two metal plates, in which said thermoplastic resin has a percentage of elongation at 20° C. of 30% or more, a peak temperature of dissipation factor (tan δ) in the range of −50° C. to 130° C., and a bonding strength toward metal plates of 3 kg/cm or more as determined by 180°-peeling test at 20° C., wherein the thermoplastic resin is formed of a resin composition comprising 100 parts by weight of a resin component (A) comprising at least one member selected from the group consisting of a mixture of crystalline polyester-type resin and an amorphous polyester-type resin, polyolefin-type resin and 1 to 100 parts by weight of a copolymer component (B) comprising 70 to 99.5% by weight of ethylene, 0.5 to 20% by weight of flycidyl methacrylate and 0 to 20% by weight of vinyl acetate.

4,883,718

FLEXIBLE COPPER-CLAD CIRCUIT SUBSTRATE

Masahiro Ohta, Yokohama; Saburo Kawashima, Yokosuka; Yoshiho Snobe, Yokohama; Shoji Tamai, Yokohama; Hideaki Oikawa, Yokohama, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

PCT No. PCT/JP86/00334, § 371 Date Feb. 5, 1988, § 102(e) Date Feb. 5, 1988, PCT Pub. No. WO88/00428, PCT Pub. Date Jan. 14, 1988

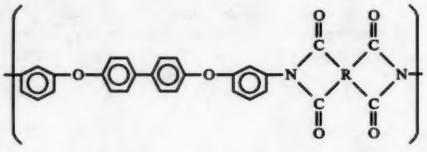
Continuation-in-part of Ser. No. 44,028, Jun. 13, 1986, Pat. No. 4,847,349. This PCT application Jun. 30, 1986, Ser. No. 159,850

Claims priority, application Japan, Feb. 12, 1985, 60-23520

Int. Cl.[4] B32B *15/08, 27/06*

U.S. Cl. 428—458 3 Claims

1. A flexible copper-clad circuit substrate comprising a high-temperature flowable polyimide film directly jointed with copper foil in the absence of adhesive therein between, the polyimide having recurring units of the formula:



wherein R is a tetra-valent radical selected from the group consisting of a aliphatic radical having 2 and more carbons, a cycloaliphatic radical, monoaromatic radical, a fused polycyclic radical and a polycyclic aromatic radical wherein the aromatic radicals are linked to one another directly or via a bridge member.

4,883,719

METHOD OF SURFACE IMPREGNATION OF WOOD ARTICLES AND WOOD ARTICLES MADE THEREWITH

Keith I. Brebner, Guelph, Canada, assignor to Wood Polymer Composite Processes Ltd., Fredericton, Canada

Filed Nov. 17, 1988, Ser. No. 272,495

Claims priority, application Canada, Nov. 20, 1987, 552414

Int. Cl.[4] B05D *3/00*

U.S. Cl. 428—541 17 Claims

1. A method for the surface impregnation of a dried finished wood article with a plastic comprising the following steps:

(a) degassing the wood article to a predetermined partial pressure;

(b) soaking the degassed wood article in a catalysed diallyl o-phthalate monomer-prepolymer solution for a predetermined period;

(c) polymerizing at approximately 200 to 210 deg. F.

6. A surface impregnated wood article when made by the method of claim 1.

4,883,720

PROCESS OF MARKING HOT STEEL INGOTS AND PRODUCT

Kurt Stangl, A-4844, Regau 106, Austria

Filed Apr. 5, 1989, Ser. No. 333,448

Claims priority, application Austria, Apr. 13, 1988, 953/88

Int. Cl.[4] G22F *3/00*

U.S. Cl. 428—552 17 Claims

17. A steel ingot which is provided on its surface with a marking comprising a metallic material which is selected from the group consisting of iron and nickel and is sinter-bonded to said surface and an oxide material which is selected from the group consisting of aluminum oxide and zirconium oxide and is sinter-bonded to said metallic material and present in an amount that is not in excess of 10% by weight of said metallic material.

4,883,721

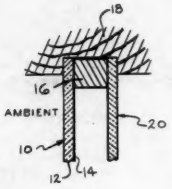
MULTI-LAYER LOW EMISSIVITY THIN FILM COATING

Raymond Nalepka, Westland, Mich., and Russell Huffer, Owatonna, Minn., assignors to Guardian Industries Corporation, Northville, Mich.

Filed Jul. 24, 1987, Ser. No. 77,226

Int. Cl.[4] B32B *15/04, 17/06*

U.S. Cl. 428—623 26 Claims



18. An improved radiation controlling product comprising, in combination,

a transparent substrate,

a plurality of thin layers disposed on one face of said substrate, said plurality of layers including

a first metallic oxide layer selected from the group consisting of zinc, tin, titanium, indium/tin and bismuth,

a second metallic layer selected from the group consisting of silver and silver alloys,

a third metallic layer selected from the group consisting of stainless steel and titanium and

a fourth metallic oxide layer having a thickness of at least 100 Angstroms selected from the group consisting of zinc, tin, titanium, indium/tin and bismuth.

4,883,722

BRASS-COATED STEEL ELEMENTS HAVING IMPROVED RUBBER ADHESION PROPERTIES

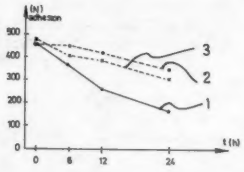
Wilfried Coppens, Kortrijk; Daniël Chambaere, Wevelgem, and Hugo Lievens, Gent, all of Belgium, assignors to N.V. Bekaert S.A., Zwevegem, Belgium

Filed Jun. 11, 1987, Ser. No. 60,634

Claims priority, application United Kingdom, Jun. 27, 1986, 8615746

Int. Cl.[4] B32B *15/06;* B60C *9/00*

U.S. Cl. 428—625 17 Claims



1. A rubber adherable steel reinforcement element having a brass alloy coating consisting essentially of a substantially homogeneous Cu-Zn composition that has an essentially alpha-brass structure, which contains incorporated therein phosphorus, in the form of phosphate ions, in an amount of from 5 to 50 mg of phosphate ions per square meter of coating surface, wherein said phosphorus in said brass alloy coating serves to

provide an enhanced adhesion to vulcanized rubber products upon heat and/or humidity aging.

4,883,723

HOT DIP ALUMINUM COATED CHROMIUM ALLOY STEEL

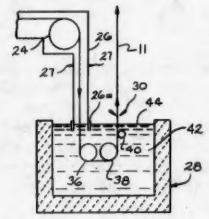
Farrell M. Kilbane, Centerville; Richard A. Coleman, West Chester; Frank C. Dunbar, and Alan F. Gibson, both of Middletown, all of Ohio, assignors to Armco Inc., Middletown, Ohio

Continuation of Ser. No. 16,920, Feb. 20, 1987, Pat. No. 4,800,135, which is a division of Ser. No. 865,238, May 20, 1986, Pat. No. 4,675,214. This application Jun. 24, 1988, Ser. No. 211,019

The portion of the term of this patent subsequent to Jan. 24, 2006, has been disclaimed.

Int. Cl.[4] B32B *15/18, 15/20*

U.S. Cl. 428—653 **4 Claims**



1. A ferrous base ferritic strip continuously hot dip coated with a coating metal prepared by a process comprising:

cleaning the ferritic strip, the base metal of said cleaned strip comprising at least about 6% by

weight chromium and less than about 3% by weight nickel, heating said cleaned strip to a temperature near or slightly above the

melting point of said coating metal,

maintaining said cleaned strip in a protective atmosphere of at least about 95% by volume hydrogen having a dew point of no more than +40° F. (+4° C.) and containing no more than about 200 ppm oxygen,

dipping said cleaned strip into a molten bath of said coating metal, which is selected from the group consisting of aluminum and aluminum alloy, to deposit a coating layer on at least one side of said cleaned strip and said coating layer formed without a thick brittle Fe-Al alloy inner layer,

said coating layer being substantially free of uncoated areas, tightly adherent, and resistant to crazing and flaking during bending of said continuous ferritic chromium alloy strip.

4,883,724

CONTROL UNIT OF FUEL CELL GENERATING SYSTEM

Osamu Yamamoto, Tiba, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Feb. 13, 1989, Ser. No. 310,534

Claims priority, application Japan, Feb. 18, 1988, 63-36333

Int. Cl.[4] H01M *10/48*

U.S. Cl. 429—23 **9 Claims**

1. In a hybrid electric power generating system including a fuel cell and a storage battery connected to the output of said fuel cell as backup for the fuel cell, a control system comprising:

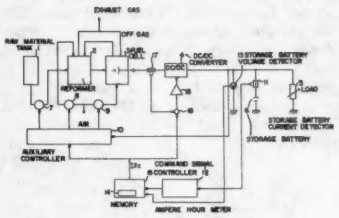
output control means for controlling the output of said fuel cell;

output current control means for controlling the current drawn from said fuel cell;

voltage detecting means for detecting the voltage of said storage battery;

means including first current detector means for detecting the current flowing to and from said battery for producing an output signal representing remaining storage capacity of said storage battery; and

first controller means including first comparing means for



comparing the detected values of the voltage of and the remaining storage capacity of said battery with set values of allowable charging and discharging voltages for the battery and the target value of always to be maintained remaining storage capacity and producing a control command signal, and means for applying said control command signal to said output control means and to said output current control means.

4,883,725

SUPPORT FRAME FOR STORAGE BATTERY CELLS

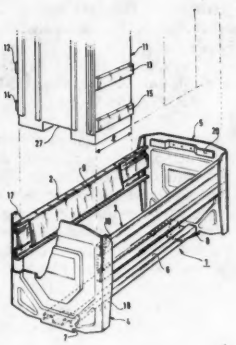
Claude Gérard, Le Bouscat, France, assignor to Saft S.A., Romainville, France

Filed Dec. 15, 1988, Ser. No. 284,493

Claims priority, application France, Feb. 22, 1988, 88 02083

Int. Cl.[4] H01M *2/10*

U.S. Cl. 429—99 **3 Claims**



1. A support frame for storage battery cells individually enclosed in cases made of molded insulating synthetic material, the frame being constituted by a metal box comprising at least two side longitudinal members, two frame end plates interconnecting the ends of the side longitudinal members, and at least one element for supporting said cases when said frame is lifted, two facing side longitudinal members each including a flexible wall which is semi-free and sloping slightly relative to the vertical so as to narrow the passage into the frame when going down towards the bottom of the frame, and the bottom ends of said flexible walls co-operating ratchet-like with longitudinal

projections or grooves carried by the cases of said cells on pairs of opposite faces and preventing the cases from being extracted once inserted even in the event of said frame being turned upsidedown.

4,883,726

MULTI-CELL BATTERY

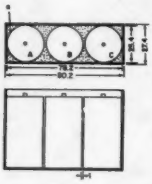
Emanuel Peled, Hanotea Street, Even Yehuda, Israel (40500); Mordechai Brand, 21 Kehilat Budapest Street 21, Tel Aviv, Israel (69701); Esther Elster, 71 Hacarmel Street, Kfar Saba, Israel (44231); Josef Kimel, 58 Brande Street, Petah-Tikva, Israel (49600), and Ronen Cohen, 55 Ein-Ganim Street, Petah-Tikva, Israel

Filed May 22, 1987, Ser. No. 52,967

Claims priority, application Israel, May 23, 1986, 78893

Int. Cl.[4] H01M *10/50, 6/42, 2/08*

U.S. Cl. 424—120 **6 Claims**



1. A multi-cell electric battery comprising a housing, a plurality of electrochemical cells of cylindrical cross section positioned in the housing, said cells having a lithium or calcium anode, and an electrically insulating substance provided in the space between the cells, the electrically insulating substance being a solid having a melting point in the range between about 40° C. and about 150° C. and being capable of taking up heat and transferring heat from one cell to the others, in an unimpaired manner.

4,883,727

VENTED NICKEL-CADMIUM STORAGE CELL

Jean-Louis Liska, Bordeaux, France, assignor to Saft, S.A., Romainville, France

Filed Mar. 9, 1989, Ser. No. 321,274

Claims priority, application France, Mar. 15, 1988, 88 03333

Int. Cl.[4] H01M *2/14*

U.S. Cl. 429—145 **5 Claims**

1. A vented alkaline storage cell implementing the nickel-cadmium couple, the cell comprising a housing containing a set of nickel positive electrodes and cadmium negative electrodes with interposed separators and an alkaline electrolyte, wherein the width of the gap between adjacent electrodes lies in the range 0.1 mm to 1 mm and is occupied by a separator comprising at least one polymer fiber felt associated with a membrane constituted by a perforated polyolefin film, with the thickness of said film lying in the range 10 μm to 50 μm, with the area of the individual peforations lying in the range 0.1 mm^2 to 20 mm^2, and with the void ratio lying in the range 5% to 50%.

4,883,728

BATTERY SYSTEMS

Pita Witehira, 34 Cowley Drive, Temple View, Hamilton, New Zealand

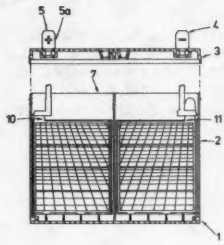
Filed Sep. 26, 1988, Ser. No. 248,715

Claims priority, application New Zealand, Mar. 3, 1987, 223730; Oct. 12, 1987, 222123; Dec. 16, 1987, 222936

Int. Cl.[4] H01M *10/12*

U.S. Cl. 429—160 **20 Claims**

1. A battery comprising a container having a plurality of cells, said plurality of cells including at least two positive terminal cells and at least one negative terminal cell, each cell containing a plurality of alternating positive and negative electrode plates separated from each other and constituting a cell element stack, each of said plates including active material, the positive electrode plates of the cell element stack in each positive terminal cell being electrically connected to a positive terminal, the negative electrode plates of the cell element stack in the or each negative terminal cell being electrically connected to a single negative terminal, each electrode plate of each cell element other than a said terminal cell being electrically connected in series to the electrode plate of opposite polarity in an adjoining cell, the cells of each series of connections being electrically connected to one common negative terminal but having separate positive terminals; and an electrolyte in contact with the positive and negative electrode plates in each cell.



4,883,729

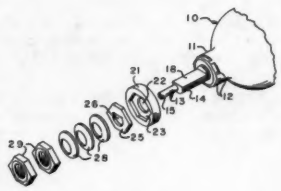
BATTERY TERMINAL LOCKING ASSEMBLY

Ronald C. Anderson, Alachua, Fla., assignor to Gates Energy Product, Inc., Gainesville, Fla.

Filed May 2, 1988, Ser. No. 189,076

Int. Cl.[4] H01M *2/30*

U.S. Cl. 429—179 **10 Claims**



1. An assembly for locking a battery terminal against rotation with respect to a container from which the terminal extends, said assembly comprising:

a first means for registering with and engaging said container so as to prevent relative rotation between said first means and said container;

a second means for registering with and engaging said terminal so as to prevent relative rotation between said second means and said terminal; and

means for releasable securing said first means to said second means, said first means and said second means engaging and cooperating to maintain said terminal and said container in a set position.

4,883,730

METHOD FOR MANUFACTURING HEAT-STABLE STRUCTURED LAYERS BASED ON EXPOXY RESIN

Hellmut Ahne, Röttenbach, and Winfried Plundrich, Nürnberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 092,473, Sep. 3, 1987, abandoned. This application Apr. 11, 1989, Ser. No. 336,578

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1986, 3630956

Int. Cl.[4] G03C *1/70, 5/16;* G03F *7/26*

U.S. Cl. 430—18 18 Claims

1. A method for manufacturing heat-stable structured layers based on epoxy resin, which comprises the steps of applying a radiation-sensitive soluble photopolymer in the form of a layer or film on a substrate, irradiating the layer or film through a negative pattern with actinic light or by using a light, electron, laser, or ion beam, and removing the non-irradiated layer or film portions, wherein the photopolymer comprises an addition reaction product of an olefinic unsaturated monoisocyanate, selected from the group consisting of an isocyanate having at least one methacrylate group, and the addition reaction product of hydroxyethyl acrylate or methacrylate and 2,4-diisocyanatotoluene, and a hydroxyl group-containing epoxy compound.

11. A heat-stable structured layer, produced according to claim 1.

4,883,731

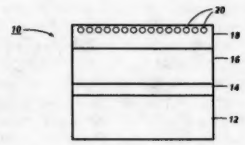
IMAGING SYSTEM

Man C. Tam, Mississauga, and Arnold L. Pundsack, Georgetown, both of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 4, 1988, Ser. No. 141,011

Int. Cl.[4] G03G *13/22*

U.S. Cl. 430—41 18 Claims



1. A process for preparing an imaging member comprising providing xeroprinting master precursor member comprising a substrate, an intermediate layer selected from the group consisting of an adhesive layer, a charge transport spacing layer and a combination of said adhesive layer and said charge transport charging layer, and an electrically insulating softenable layer on said substrate, said softenable layer comprising charge transport molecules and a fracturable layer of electrically photosensitive migration marking material located substantially at or near the surface of said softenable layer spaced from said substrate, said charge transport spacing layer and said softenable layer comprising charge transport molecules, said charge transport molecules being predominantly nonabsorbing in the spectral region at which said electrically photosensitive migration marking material photogenerates charge carriers, being capable of increasing charge injection from said electrically photosensitive migration marking material to said softenable layer, being capable of transporting charge to said substrate, and being dissolved or molecularly dispersed in said softenable layer; electrostatically charging said member; exposing said member to activating radiation in an imagewise pattern; and developing said member by decreasing the resistance to migration of marking material in depth in said softenable layer at least sufficient to allow migration of marking material whereby marking material struck by said activating radiation migrates toward said substrate in image configuration.

4,883,732

METHOD OF FORMING PRINTING PLATE USING ISOINDOLENINE DERATIVES

Reinhold Leyrer, Ludwigshafen, and Peter Neumann, Mannheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 274,969, Nov. 22, 1988. This application May 24, 1989, Ser. No. 356,069

Int. Cl.[4] G03G *13/28*

U.S. Cl. 430—49 10 Claims

1. A process for preparing an offset printing plate from an electrophotographic recording material, comprising the following steps in the given order:

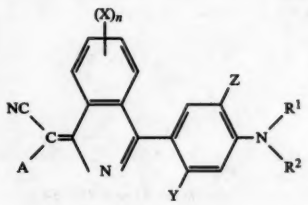
1. charging an electrophotographic recording element with an electrically positive or electrically negative charge by means of a high-voltage corona, said electrophotographic recording element comprising

(A) an electrically conducting base and

(B) at least one layer consisting essentially of

(b_1) at least one binder,

(b_2) at least one sensitizer which on exposure of layer (B) generates charge carriers and which is selected from the group of the isoindolenine dyes of the general structure I



I

where the index and the variables are defined as follows:

A is cyano, carbo-C_1–C_4-alkoxy, carbamoyl, N-C_1–C_4-alkylcarbamoyl, N-C_1–C_4-alkylcarbamoyl where the alkyl is substituted by C_1–C_4-alkoxy, N-phenylcarbamoyl, N-phenylcarbamoyl where the phenyl is substituted by C_1–C_4-alkyl or C_1–C_4-alkoxy, or is acetyl, benzoyl, 4-nitrophenyl or 4-cyanophenyl,

X is hydrogen, chlorine, C_1–C_4-alkyl or C_1–C_4-alkoxy, it being possible when n=2 for the substituents to be identical or different,

n is 1 or 2,

R^1 is hydrogen, methyl, ethyl or 2-hydroxyethyl and

R^2 is phenyl, C_1–C_4-alkyl- or C_1–C_4-alkoxy-substituted phenyl or cyclohexyl, or

R^1 is hydrogen and

R^2 is C_1–C_4-alkyl, or

R^1 and R^2 are each C_1–C_6-alkyl, C_1–C_4-alkyl which is substituted by chlorine, cyano, hydroxyl, C_1–C_4-alkoxy, phenoxy, C_2–C_5-alkanoyloxy, C_2–C_5-alkanoyloxy which is substituted by C_1–C_4-alkoxy or phenoxy, or carbo-C_1–C_4-alkoxy, or are each allyl or phenyl-C_1–C_4-alkyl, or the group

is a saturated or unsaturated heterocyclic five-membered ring, a saturated or unsaturated heterocyclic six-membered ring, a saturated or unsaturated heterocyclic five-or six-membered

ring which each additionally contains an oxygen atom or a further nitrogen atom,

Y is hydrogen, hydroxyl, methyl or ethyl,

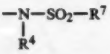
Y is

where R^3 is linear or branched C_1–C_{12}-alkyl, phenyl or C_1–C_4-alkyl- or C_1–C_4-alkoxy-substituted phenyl,

Y is

where R^4 is hydrogen or C_1–C_4-alkyl and R^5 has the following meanings: hydrogen, linear or branched C_1–C_{12}-alkyl, trifluoromethyl, chloromethyl, C_1–C_4-alkoxymethyl, phenoxymethyl, phenoxymethyl with one of the following substituents in the phenoxy group: chlorine, methoxy, nitro or C_1–C_4-alkyl, phenoxymethyl with two substituents selected from the group consisting of chlorine, methoxy, nitro and C_1–C_4-alkyl in the phenoxy group, phenylthiomethyl, phenylthiomethyl where the phenyl is substituted by C_1–C_4-alkyl, benzyl, phenylethyl, C_3–C_7-cycloalkyl, phenyl, C_1–C_{12}-alkyl-, C_1–C_{12}-alkoxy- or nitro-substituted phenyl, H_5C_6—CH=CH—, or —CH_2—$PO(OR^6)_2$, where R^6 is C_1–C_4-alkyl, or

Y is



where R^4 is as defined above and R^7 is C_1–C_{12}-alkyl, phenyl or C_1–C_{12}-alkylphenyl, or

Y is N-C_1–C_4-alkylamino when R^1 and R^2 are each C_1–C_4-alkyl, or

Y is N,N-di-C_1–C_4-alkylamino, N-pyrrolidinyl, N-piperidinyl or N-morpholinyl, when

has the same meaning, and

Z is hydrogen or if R^1 and R^2 are each C_1–C_4-alkyl or allyl and Y is

also methoxy or ethoxy, and

(b_3) at least one photoconductor which transports the generated charge carriers,

2. subjecting the electrically negatively or electrically positively charged electrophotographic recording element to imagewise exposure with actinic light to produce a latent electrostatic image,

3. developing the latent electrostatic image by means of a solid or liquid toner to produce a toner image,

4. fixing the tonered image by heating and

5. washing away the untonered nonimage areas of the photoconductive layer (B) of the electrophotographic recording element with a developer solvent to bare the hydrophilic surface of the base (A).

4,883,733

ELECTROPHOTOGRAPHIC PRINTING PROCESS USING PHOTOCHROMIC COMPOUND

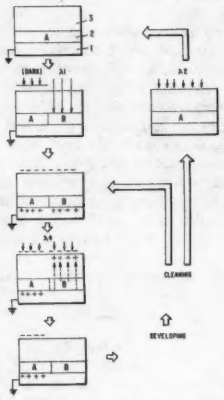
Hiroshi Sugimura, Habikino; Eiji Imada, Nara; Yoshimi Kojima, Nara, and Shuhei Tsuchimoto, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 15, 1988, Ser. No. 219,932

Claims priority, application Japan, Jul. 17, 1987, 62-179715

Int. Cl.[4] G03G *13/22*

U.S. Cl. 430—54 **13 Claims**



1. An electrophotographic printing process comprising the steps of:

imagewise exposing a photosensitive means with light of a first wavelength at which photochromism occurs, to thereby record the image therein, wherein said photosensitive means has a photosensitive layer formed on a conductive support, said photosensitive layer containing a photochromically sensitive compound that shows photoconductivity when irradiated with light of different wavelengths before and after said photochromism occurs;

charging the entire surface of said photosensitive layer; and

uniformly exposing said photosensitive means with light of a third or fourth wavelength at which photochromism does not occur, but at which said photochromically sensitive compound or photoisomeric compound therewith shows photoconductivity respectively, to thereby form the image of a charge pattern on the surface of said photosensitive layer.

4,883,734

TONER FOR DEVELOPMENT OF ELECTROSTATIC IMAGE AND METHOD OF FIXING EMPLOYING THE SAME

Satoru Ikeuchi; Mitutaka Arai; Yuki Okuyama, all of Hachioji; Hideki Yuri, Ibaraki; Tomoo Shiohara, and Yasuhiko Oyama, both of Kyoto, all of Japan, assignors to Konica Corporation and Sekisui Kagaku Kogyo Kabushiki, both of, Japan

Filed Mar. 1, 1988, Ser. No. 162,801

Claims priority, application Japan, Mar. 3, 1987, 62-48522

Int. Cl.[4] G03G *9/08, 9/14*

U.S. Cl. 430—109 **14 Claims**

1. A toner for developing an electrostatic image comprising, as a main component, a resin obtained by allowing a polymer containing a low molecular weight polymer component and a high molecular weight polymer component, wherein at least said lower molecular weight polymer component contains a carboxylic acid component; to react with a polyvalent metal compound,

said low molecular weight polymer component being obtained from (a) a styrene monomer, (b) an acrylic acid

ester or methacrylic acid ester type monomer, and (c) a half ester compound obtained by subjecting an acrylic acid or methacrylic acid type derivative having a hydroxyl group to an esterification reaction with a dicarboxylic acid,

said low molecular weight polymer component having a maximum molecular weight distribution of 1×10^3 to 2×10^4, said polymer component of high molecular weight having a maximum molecular weight distribution of 10^5 to 2×10^6.

4,883,735

NEGATIVELY CHARGEABLE TONER FOR USE IN DRY ELECTROPHOTOGRAPHY

Masao Watanabe, and Hiroshi Nagase, both of Tokyo, Japan, assignors to Fujikura Kasei Co., Ltd., Tokyo, Japan

Filed Jan. 25, 1988, Ser. No. 148,349

Claims priority, application Japan, Jan. 28, 1987, 62-16267

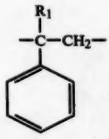
Int. Cl.[4] G03G *9/00, 13/20*

U.S. Cl. 430—109 **11 Claims**

1. A negatively chargeable toner for use in dry electrophotography, said toner comprising

(A) a resinous binder composed of at least one resin selected from copolymers of styrene and/or alpha-methylstyrene with alkyl (meth)acrylates,

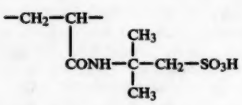
(B) 2 to 10 parts by weight, per 100 parts by weight of the resinous binder, of a copolymer containing a sulfonic acid group, said copolymer having a weight average molecular weight of from 2,000 to 15,000 and composed of 80 to 98% by weight of recurring units represented by the formula



(I)

wherein R_1 represents a hydrogen atom or a methyl group,

and 20 to 2% by weight of recurring units represented by the formula



(II)

(C) a coloring agent.

4,883,736

ELECTROPHOTOGRAPHIC TONER AND DEVELOPER COMPOSITIONS WITH POLYMERIC ALCOHOL WAXES

Thomas R. Hoffend, Webster, and Don B. Jugle, Penfield, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jan. 20, 1987, Ser. No. 4,939

Int. Cl.[4] G03G *9/08*

U.S. Cl. 430—110 **111 Claims**

1. A toner composition comprised of resin particles, pigment particles, and a wax component present in an amount of from about 0.05 percent by weight to about 20 percent by weight and comprised of polymeric alcohols of the formula

$$CH_3(CH_2)_nCH_2OH$$

wherein n is a number of from about 30 to about 300, which composition prevents cometing.

4,883,737

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT AND POLYMERIZABLE COMPOUND AND CONTAINING CORE/SHELL GRAINS DOPED WITH IRIDIUM

Soichiro Yamamoto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 7, 1988, Ser. No. 165,042

Claims priority, application Japan, Mar. 6, 1987, 62-51621

Int. Cl.[4] G03C *1/72, 1/44*

U.S. Cl. 430—138 **8 Claims**

1. A light-sensitive material comprising a support and a light-sensitive layer containing a silver halide grain, an ethylenically unsaturated polymerizable compound, a reducing agent and a color image forming substance, said polymerizable compound and color image forming substance being contained in microcapsules, wherein the silver halide grain has a core/shell structure, at least 90 mole % of the halogen of the silver halide in the shell portion of the silver halide grain is iodine, and the silver halide grain contains iridium ion in an amount of 10^{-7} to 10^{-3} mole based on one mole of the silver halide grain, said iridium ion being introduced into the silver halide in the form of a water soluble iridium salt having the formula (I) or (II):

$$(R)_mIrX_6 \quad (I)$$

$$Ir(X)_n \quad (II)$$

wherein R is a monovalent anion selected from the group consisting of a hydrogen ion, a sodium ion, a potassium ion and an ammonium ion; X is a halogen ion; m is 2 or 3; and n is 3 or 4.

4,883,738

SILVER HALIDE AND POLYMERIZABLE COMPOUND CONTAINING LIGHT-SENSITIVE LAYER PROVIDED ON SUPPORT OF DEFINED ROUGHNESS

Makoto Yamada, Minami, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

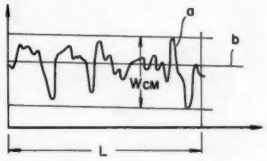
Filed Mar. 11, 1987, Ser. No. 24,501

Claims priority, application Japan, Mar. 11, 1986, 61-52996

The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.

Int. Cl.[4] G03C *5/54, 1/86, 1/96*

U.S. Cl. 430—138 **14 Claims**



1. A light-sensitive material comprising a light-sensitive layer which contains a silver halide, a reducing agent and a polymerizable compound containing carbon to carbon unsaturation provided on a porous support, said silver halide and said polymerizable compound being contained in microcapsules which are dispersed in the light-sensitive layer, wherein the porous support has such a surface characteristic that a filtered maximum waviness of not less than 4 μm is observed in not more than 20 positions among 100 positions which are determined at random on a filtered waviness curve, the filtered maximum waviness being determined within basic length of 2.5 mm extracted from the filtered waviness curve which is obtained from the profile of the porous support under the condition of the cut-off value of 0.8 mm according to JIS-B-0610.

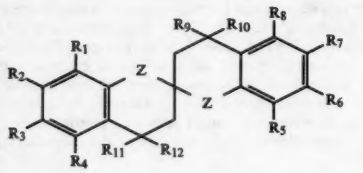
4,883,739

LIGHT-SENSITIVE RESIN COMPOSITION WITH 1,2-NAPHTHOQUINONE DIAZIDE COMPOUND HAVING SPIROBICHROMAN OR SPIROBIINOANE RING

Shinji Sakaguchi, and Shiro Tan, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 16, 1988, Ser. No. 245,190
Claims priority, application Japan, Sep. 17, 1987, 62-233292
Int. Cl.[4] G03C 1/54
U.S. Cl. 430—192 3 Claims

1. A light sensitive resin composition comprising a light-sensitive substance represented by the formula (A) shown below and an alkali-soluble resin:



(A)

wherein R_1 to R_8 are independently hydrogen, a hydroxyl group, a halogen atom, an alkyl group, an alkoxy group, an aralkyl group, an aryl group, an amino group, a monoalkylamino group, a dialkylamino group, an acylamino group, an alkylcarbamoyl group, an arylcarbamoyl group, an alkylsulfamoyl group, an arylsulfamoyl group, a carboxyl group, a cyano group, a nitro group, an acyl group, an alkyloxycarbonyl group, an aryloxycarbonyl group, an acyloxy group, -OD, or

(wherein R is hydrogen, or an alkyl group, and D is a 1,2-naphthoquinonediazido-5-sulfonyl group or a 1,2-naphthoquinonediazido-4-sulfonyl group);

R_9 to R_{12} are independently hydrogen or a lower alkyl group; and

Z is oxygen or a single bond; provided that at least one of R_1 to R_8 is -OD or

4,883,740

RADIATION-SENSITIVE MIXTURE FOR PHOTOSENSITIVE COATING MATERIALS

Reinhold Schwalm, Wachenheim; Andreas Boettcher, Nussloch, and Horst Binder, Lampertheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 30, 1988, Ser. No. 219,689
Int. Cl.[4] G03C 1/495, 5/16, 5/00
U.S. Cl. 430—270 17 Claims

1. A radiation-sensitive mixture containing

(a) a polymeric binder which is insoluble in water but soluble in aqueous alkaline solutions and

(b) an organic compound whose solubility in an aqueous alkaline developer is increased by the action of an acid and which contains one or more acid-cleavable groups, wherein the organic compound (b) additionally contains one or more onium salt groups which form a strong acid under the action of radiation.

16. A process for the production of a relief pattern or relief image which comprises:

exposing a radiation-sensitive recording layer imagewise to sufficient radiation to increase the solubility of the exposed parts in aqueous alkaline solvents, said recording layer consisting essentially of

(a) a polymeric binder which is insoluble in water but soluble in aqueous alkaline solutions and

(b) an organic compound whose solubility in an aqueous alkaline developer is increased by the action of an acid and which contains one or more acid-cleavable groups, wherein the organic compound (b) additionally contains one or more onium salt groups which form a strong acid under the action of radiation, and thereafter applying an alkaline developer to the exposed layer to selectively remove the exposed parts.

4,883,741

INFORMATION RECORDING MEDIUM

Younosuke Takahashi, and Takayuki Kuriyama, both of Fujinomiya, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigari, Japan

Filed Aug. 28, 1987, Ser. No. 90,549
Claims priority, application Japan, Aug. 28, 1986, 61-203483
Int. Cl.[4] G03C 5/16
U.S. Cl. 430—270 9 Claims

1. A process for recording information on a recording layer arranged on a substrate, said recording layer containing an organic metal complex compound having the formula:

MmLn

where M is a metal atom belonging to one of groups Ib, IVb, Vb, VIb, VIIb, or VIII of the Periodic Table, L is a ligand, m is an integer from 1 to 4, and n is an integer from 2 to 12, and a sensitizing dye capable of absorbing near infrared rays, by irradiating the recording layer with a laser beam to deposit a metal component in the recording layer at the irradiated area by decomposition of the organic metal complex compound.

4,883,742

SEAMLESS AND FIRM JOINING OF THE END AND/OR LATERAL AREAS OF PHOTOSENSITIVE LAYERS

Guënter Wallbillitch, Neustadt, Fed. Rep. of Germany, and Jan H. Van Heuvelen, Losser, Netherlands, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Feb. 9, 1988, Ser. No. 153,940
Claims priority, application Fed. Rep. of Germany, Feb. 14, 1987, 3704693
Int. Cl.[4] G03C 1/94
U.S. Cl. 430—275 15 Claims

1. A process for the coating of a cylinder or sleeve with a seamless photosensitive layer, said process comprising:

applying to the cylinder or sleeve one or more unsupported photosensitive layers to cover the surface of the cylinder or sleeve therewith, said photosensitive layer or layers being essentially solvent-free and thermoplastically processable;

carrying out the said application of the photosensitive layer or layers to the cylinder or sleeve in such a way that the end and/or lateral areas of the photosensitive layer or layers that are next to each other overlap;

displacing the air between the overlapping end and/or lateral areas to prevent any bubble formation therebetween;

heating the total layer material under pressure, thereby joining the overlapping end and/or lateral areas, and

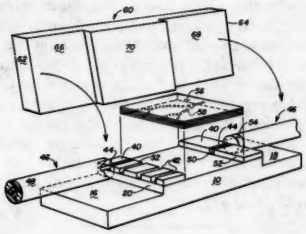
shaping to the exact size and smoothing the resulting continuously joined photosensitive layer.

4,883,743

OPTICAL FIBER CONNECTOR ASSEMBLIES AND METHODS OF MAKING THE ASSEMBLIES

Bruce L. Booth, West Chester, Pa., and Joseph E. Marchegiano, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 15, 1988, Ser. No. 144,002
Int. Cl.[4] G03C 5/00
U.S. Cl. 430—321 23 Claims



1. A method of making an optical fiber connector assembly having a waveguide for use in an optical fiber system, comprising the steps of:

laminating a radiation sensitive layer capable of forming a stencil relief image to a step of a pedestal;

aligning a mask on the layer, the mask having clear portions for transmitting light and opaque portions for blocking transmission of light;

exposing the layer to light through the clear portions of the mask; and

removing unexposed regions of the layer and a region of the layer corresponding to the waveguide leaving remaining exposed regions on two end portions of the step, each exposed region having a groove.

4,883,744

FORMING A POLYMIDE PATTERN ON A SUBSTRATE

Natalie B. Feilchenfeld; Stephen J. Fuerniss, both of Endicott; John J. Glenning, Vestal; Walter P. Pawlowski; Giana M. Phelan, both of Endicott, and Paul G. Rickerl, Endicott, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 17, 1988, Ser. No. 196,641
Int. Cl.[4] G03C 5/16
U.S. Cl. 430—325 21 Claims

1. A process of forming a polyimide pattern on a substrate which comprises:

(a) providing on the substrate a layer of photosensitive polyimide precursor comprising a polyimide precursor and a compound having a photosensitive group;

(b) prebaking the layer of photosensitive polyimide precursor by placing the layer in an oven and ramping up the temperature of the oven to about 90° C. and maintaining at about 90° C. for up to about 2 minutes, then ramping down to about 80° C. and maintaining about 80° C. for about 90 minutes to 150 minutes and cooling down to at least about 60° C.;

(c) exposing said layer imagewise to actinic radiation through a photomask to form an exposed image pattern of polyimide precursor in the layer;

(d) removing unexposed areas of the layer with a liquid developer; and

(e) curing the exposed image pattern of the polyimide precursor in the layer by heating.

4,883,745

SILVER-COPPER-TITANIUM BRAZING ALLOY CONTAINING CRUST INHIBITING ELEMENT

Howard Mizuhara, Hillsborough, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Filed Nov. 7, 1988, Ser. No. 268,142
Int. Cl.[4] C22C 5/08
U.S. Cl. 420—502 7 Claims

1. A brazing alloy having a composition consisting essentially of titanium in an amount of 0.5 to 5 weight percent, silver in an amount of 55 to 73 weight percent, from 0.1 to less than 2 weight percent of at least one crust eliminating element, selected from the group consisting of tin, indium, silicon, aluminum and manganese which inhibits crust formation of the brazing alloy when the brazing alloy is melted and cooled, the balance of the composition being copper.

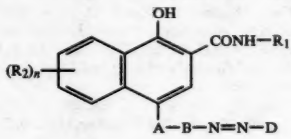
4,883,746

SILVER HALIDE PHOTOGRAPHIC MATERIAL

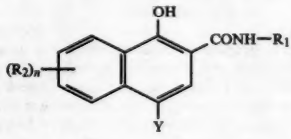
Yasuhiro Shimada; Hiroshi Fukuzawa, and Seiji Ichijima, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 868,389, May 29, 1986, abandoned.
This application Feb. 13, 1989, Ser. No. 309,925
Claims priority, application Japan, May 29, 1985, 60-114242
Int. Cl.[4] G03C 7/26, 7/32
U.S. Cl. 430—504 20 Claims

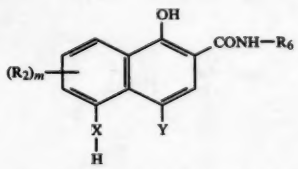
1. A silver halide photographic material comprising a blue-sensitive silver halide emulsion layer, a green-sensitive silver halide emulsion layer, a red-sensitive silver halide emulsion layer on a support and at least one of the color couplers represented by the general formula (I) and at least one of the cyan couplers represented by the general formulae (IV) and (V)



(I)



(IV)



(V)

wherein R_1 represents an aromatic or heterocyclic group; R_2 represents a group capable of being substituted on a naphthol ring; R_6 represents an aliphatic group; n represents an integer of 0 to 4; m represens an integer of 0 to 3; A-B-N=N-D represents a group which is eliminated upon coupling; A represents a divalent group whose bond to the carbon atom at the coupling active position of the coupler is cleaved upon the reaction with an oxidation product of a color developing agent; B represents a divalent aromatic or heterocyclic group; D represents an aromatic or heterocyclic group; Y represents a hydrogen atom or a group which is eliminated upon coupling; X represents —O—, —S— or

in which R_7 represents a hydrogen atom or an organic substituent group, with the proviso that when n and m are other than 0, R_2 may be the same as or different from each other or may be bonded to each other to form a ring; R_2 and X or X and Y in the general formula (V) may be bonded to each other to form a ring; R_1, R_2, R_6, R_7, X or Y may form a dimer or higher polymer; and at least one of the groups represented by A, B and D in the general formula (I) has a sulfo group, a carboxyl group, or an alkali metal or an ammonium salt thereof as a substituent group, wherein said red-sensitive silver halide emulsion layer contains at least one of the colored couplers represented by the general formula (I) and wherein the red-sensitive silver halide emulsion layer comprises two or more unit layers having different sensitivities, and of the unit layers, at least one of the unit layers other than the unit layer lowest in sensitivity comprises at least one cyan coupler selected from the following group (A) and the unit layer lowest in sensitivity comprises at least one cyan coupler selected from the following group (B):

(A) cyan couplers represented by the general formula (IV) wherein Y represents an aryloxy group or an alkoxy group and cyan couplers represented by the general formula (V) wherein Y represents an aryloxy group or an alkoxy group; and

(B) cyan couplers represented by the general formula (IV) or (V) wherein Y represents a hydrogen atom.

4,883,747

COLOR PHOTOTHERMOGRAPHIC ELEMENTS

Duncan M. A. Grieve, Walden; Stephen S. C. Poon, Harlow; Tran V. Thien, Harlow, all of Great Britain; Kumars Sakizadeh, Woodbury, and David C. Weigel, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

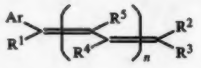
Filed May 31, 1988, Ser. No. 200,665

Claims priority, application United Kingdom, Jun. 3, 1987, 8712961

Int. Cl.[4] G03C *1/14*

U.S. Cl. 430—542 **13 Claims**

12. A photothermographic element comprising a support bearing a photothermographic medium, the medium comprising a light sensitive silver halide in reactive association with a silver salt of an organic acid and a colour generating reducing agent which is a leuco compound which is oxidisable by silver ions into a coloured dye of the general formula:



in which:

n=0, 1 or 2,

R^1 represents H, CN, lower alkyl of 1 to 5 carbon atoms, aryl or $COOR^6$ in which R^6 is lower alkyl of 1 to 5 carbon atoms or aryl,

R^2 and R^3 independently represent CN, NO_2, $COOR^6$, SO_2R^6, $CONHR^6$ in which R^6 is as defined above or H, or R^2 and R^3 together represent the necessary atoms to form a 5- or 6-membered carbocyclic or heterocyclic ring having ring atoms selected from C, N, O and S atoms, which carbocyclic or heterocyclic rings possess at least one conjugated electron withdrawing substituent,

R^4 and R^5 independently represent H, CN or lower alkyl of 1 to 5 carbon atoms or together represent the necessary atoms to complete a 5- or 6-membered carbocyclic ring, and

Ar represents:

(a) a thienyl group which may be substituted with one or more lower alkyl groups of 1 to 5 carbon atoms,

(b) a furyl group which may be substituted with one or more lower alkyl groups of 1 to 5 carbon atoms or

(c) a phenyl group which may be substituted with one or more groups selected from halogen, hydroxy, lower alkyl of 1 to 5 carbon atoms, lower alkoxy of 1 to 5 carbon atoms, NR^7R^8 in which R^7 and R^8 are independently selected from H, lower alkyl group of 1 to 5 carbon atoms which may possess substituents selected from CN, OH, halogen and phenyl, and phenyl group which may be substituted with substituents selected from OH, halogen, lower alkyl of 1 to 5 carbon atoms or lower alkoxy of 1 to 5 carbon atoms or R^7 and R^8 together represent the necessary atoms to complete a morpholino group, or when Ar is a phenyl group, that phenyl group may be part of a larger ring structure comprising two or more rings which may be aromatic or heterocyclic containing up to 20 ring atoms selected from C, N, O and S.

4,883,748

NEGATIVE SILVER HALIDE PHOTOGRAPHIC EMULSION

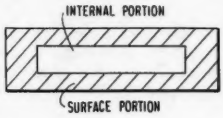
Toshiaki Hayakawa, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 9, 1988, Ser. No. 282,094

Claims priority, application Japan, Dec. 9, 1987, 62-311419

Int. Cl.[4] G03C *1/02*

U.S. Cl. 430—567 **10 Claims**



1. A negative silver halide photographic emulsion comprising silver halide grains dispersed in a binder, said silver halide grains having the ratio of diameter to thickness of 5.0 or less, said grains further having an internal portion corresponding to half the volume of said silver halide grains and a surface portion corresponding to half the volume of said silver halide grains, wherein the average iodine content in the internal portion is less than 1 mol %, and wherein the average iodine content in the surface portion of the grains is 1 to 4 mol % higher than the average iodine content of the internal portion of said grains.

4,883,749

CHILDREN'S TOILET TRAINING DEVICE WITH DIFFERENTIATING MEANS

Freddie R. Roberts, and Robert W. Lancette, both of Clarksville, Tenn., assignors to Pee Patch, Inc., Clarksville, Tenn.

Filed Aug. 15, 1988, Ser. No. 232,448

Int. Cl.[4] G09B *19/00*; E03D *13/00*

U.S. Cl. 434—247 **32 Claims**

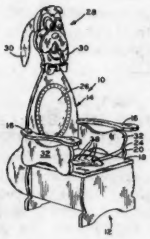
1. A toilet training device for differentiating the deposition of solid or liquid excrement therein and generating a corresponding signal, the device comprising:

an excrement container having an entrance area;

a light-emitting means for emitting light substantially intersecting said entrance area;

a light-sensing means for sensing said light and generating an electrical signal in response thereto, said electrical signals including a first electrical signal generated in response to the deposition of liquid excrement and a second electrical

signal generated in response to the deposition of solid excrement; and,



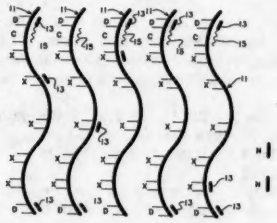
means for generating one of a sound or sight signal in response to said electrical signal.

4,883,750

DETECTION OF SPECIFIC SEQUENCES IN NUCLEIC ACIDS

Norman M. Whiteley; Michael W. Hunkapiller, both of San Carlos, and Alexander N. Glazer, Orinda, all of Calif., assignors to Applied Biosystems, Inc., Foster City, Calif.

Filed Dec. 13, 1984, Ser. No. 681,055
Int. Cl.[4] C12Q *1/68*
U.S. Cl. 435—6 **31 Claims**



1. A method of testing for the presence or absence of a target sequence in a sample containing DNA, the steps comprising:

(a) denaturing the sample DNA;

(b) treating the denatured DNA with a first probe which is complementary to a first portion of the target sequence to produce a duplex of first probe and denatured DNA;

(c) treating the duplex formed in step (b) with a second probe, which is shorter than the first probe and ligatable therewith, and which is complementary to the remaining portion of the target sequence;

(d) providing conditions for hybridization of the first probe and second probe to the target sequence in steps (b) and (c) wherein, by controlling stringency, the first probe does not bind substantially to the denature DNA which does not contain the first portion and wherein the second probe does not bind substantially to the denatured DNA which does not contain the remaining portion, the first probe and the second probe being of sufficient length that they can be stably hybridized to the target sequence long enough to be ligated to each other, and wherein at least one of the first and second probe is labeled;

(e) ligating first and second probe which are hybridized to the target sequence;

(f) removing unligated probe after step (e);

(g) testing for the presence of label.

4,883,751

SPECIFIC IMMUNOASSAY FOR HEPARIN

Sanford N. Gitel, Elizabeth, N.J., and Stanford Wessler, Rye, N.Y., assignors to New York University, New York, N.Y.

Filed May 28, 1986, Ser. No. 868,122
Int. Cl.[4] G01N *33/543, 53/00*
U.S. Cl. 435—7 **21 Claims**

1. An assay for measuring the amount of heparin present in a biological fluid comprising the steps of:

incubating a sample of said fluid in the presence of an immobilized heparin inhibitor, said heparin inhibitor being a positively charged polycarbodiimide compound, thereby causing the heparin contained in said sample to bind to said inhibitor and form an immobilized heparin-inhibitor bimolecular complex;

incubating the heparin-inhibitor complex with a first antibody, said first antibody being an antibody immunochemically reactive with said heparin-inhibitor complex and not reactive with free heparin, thereby causing said first antibody to bind to said heparin-inhibitor complex and form an immobilized heparin-inhibitor-antibody complex;

incubating said heparin-inhibitor-antibody complex with a second antibody immunochemically reactive with said first antibody, said second antibody being capable of being quantitatively detected, thereby forming an immobilized heparin-inhibitor-antibody-(second antibody) complex; and

determining the amount of said immobilized second antibody by reference to the binding of a known amount of said second antibody to a known amount of said heparin-inhibitor-antibody complex.

4,883,752

METHOD FOR PREPARING MONOCLONAL ANTIBODY TO HBSAG

Yasuyuki Eda; Toshihiro Maeda; Kiyoto Nishiyama, and Akira Tashiro, all of Kumamoto, Japan, assignors to Juridical Foundation the Chemo-Sero-Therapeutic Research Institute, Kumamoto, Japan

Filed Oct. 24, 1985, Ser. No. 791,163
Claims priority, application Japan, Oct. 26, 1984, 59-226394
Int. Cl.[4] C12P *21/00*; C12N *5/00*
U.S. Cl. 435—68 **8 Claims**

1. A method for preparing a human-derived monoclonal antibody to hepatitis B surface antigen (HBsAg) comprising the steps of:

administering HBsAg vaccine to humans who test positive with respect to anti-HBsAg antibody;

recovering lymphocyte cells from the humans having a titer of anti-HBsAg of at least 10 IU/ml in blood two weeks after administration of said HBsAg;

culturing the lymphocyte cells in vitro for seven days and selecting the lymphocyte cells with a culture supernatant containing anti-HBsAg antibody in an amount of at least 0.01 IU/ml;

stimulating the lymphocyte cells by addition of a non-specific lymphocyte activator;

fusing the lymphocyte cells to myeloma cells to form hybridomas;

cloning said hybridomas;

selecting clones producing the antibody to HBsAg; and

culturing said hybridomas and collecting the antibody to HBsAg produced by said hybridomas.

4,883,753

HIGH-YIELD METHANE PRODUCTION PROCESS BY CULTURE OF *METHANOBACTERIUM THERMOAUTOTROPHICUM* OR ANY OTHER METHANOGENIC BACTERIUM HAVING THE SAME PHYSIOLOGICAL GROWTH PROPERTIES

Jean-Pierre Belaich, Marseilles; Marie-Laure Fardeau, Pennes Mirabeau; Jean-Paul Peillex, and André Pavia, both of Montpellier, all of France, assignors to Gaz De France, France

Filed Jul. 16, 1987, Ser. No. 74,284
Claims priority, application France, Jul. 17, 1986, 86 10431
Int. Cl.[4] C12P *5/02*
U.S. Cl. 435—167 **4 Claims**

1. A process for producing methane with high yield comprising the step of cultivating on a culture medium containing a source of nitrogen and assimilable salts and thermophilic methanogenic bacterium having the same physiological growth properties as *Methanobacterium thermoautotrophicum* with a forced supply of gaseous H_2/CO_2 mixture having a gas transfer velocity of at least 50 liters of H_2/CO_2 mixture per liter and per hour.

4,883,754

BACTERIAL FC RECEPTORS

Michael D. P. Boyle, Gainesville, Fla., and Michele Yarnall, Pullman, Wash., assignors to University of Florida Research Foundation, Alachua, Fla.

Filed Mar. 6, 1986, Ser. No. 836,743
Int. Cl.[4] C07K *15/00*
U.S. Cl. 435—177 **6 Claims**

1. A type II proteinaceous, antigenic factor derived from a group A strepococcus which is a receptor for the Fc region of human IgG_3 and which exhibits a major diffuse protein band on polyacrylamide gel electrophoresis and which has a molecular weight of approximately 38,000 daltons.

4,883,755

METHOD OF REENDOTHELIALIZING VASCULAR LININGS

R. Anthony Carabasi, Bryn Mawr; Bruce E. Jarrell, Philadelphia, both of Pa., and Stuart K. Williams, Wilmington, Del., assignors to Thomas Jefferson University, Philadelphia, Pa.

Filed Oct. 28, 1987, Ser. No. 114,242
Int. Cl.[4] C12N *5/00*; A01N *1/00*; A61K *35/14, 37/00*
U.S. Cl. 435—240.2 **13 Claims**

1. A method of reendothelializing the vascular passage of a patient, the lining of which has been substantially denuded of endothelial cells, comprising

(a) interrupting the flow of blood through said vascular passage,

(b) applying to said denuded vascular lining uncultured endothelial cells retrieved from the microvessels of said patient in a density sufficient to provide coverage of at least about 50% of said denuded portion; and

(c) maintaining the interruption of blood flow through said vascular passage for a period of time sufficient to allow said applied cells to form an attachment to said vascular lining sufficient to withstand the shear created by resumed blood flow through said vascular passage.

4,883,756

PTN1060, A CONJUGAL PLASMID AND DERIVATIVES THEREOF THAT CONFER PHAGE RESISTANCE TO GROUP N STREPTOCOCCI

Todd R. Klaenhammer, and Rosemary B. Sanozky-Dawes, both of Raleigh, N.C., assignors to North Carolina State University, Raleigh, N.C.

Filed Dec. 16, 1986, Ser. No. 942,524
Int. Cl.[4] C12N *1/20, 15/00*; C12R *1/46*; A23C *9/123*
U.S. Cl. 435—252.3 **12 Claims**

1. The plasmid pTN1030 (ATCC Accession Number 67273) characterized by a molecular weight of 60.0±3.0 megadaltons, having the restriction endonuclease cleavage map as shown in the Figure, and capable of expressing restriction and modification activity, conjugal transfer activity, and lactose fermentation activity in a suitable host.

5. A microorganism containing the plasmid of claim 1, said microorganism selected from the group consisting of *Streptococcus lactis, S. lactis* subsp. *diacetylactis,* and *S. cremoris.*

4,883,757

BIOEMULSIFIER PRODUCTION BY ACINETOBACTER CALCOACETICUS STRAINS

David L. Gutnick, Moshav Sdei Hemed, Israel; Eirik Nestaas, Chestnut Hill, Mass.; Eugene Rosenberg, Raanana, and Nechemia Sar, Holon, both of Israel, assignors to Petroleum Fermentations N.V., Curacao, Netherlands Antilles

Continuation of Ser. No. 676,916, Nov. 30, 1984, abandoned. This application Nov. 24, 1987, Ser. No. 129,389
Int. Cl.[4] C12N *1/20*; C12R *1/01*; B01F *17/00*
U.S. Cl. 435—252.1 **22 Claims**

1. A substantially cell-free medium from a bacterial cell culture in which *Acinetobacter calcoaceticus* NRRL B-15847 has been grown, characterized by nondialyzable emulsifying activity for at least one hydrocarbon, comprising medium from a bacterial cell culture in which *Acinetobacter calcoaceticus* strain NRRL B-15847 has been grown and from which the bacterial cells have been substantially removed.

18. A substantially pure culture of *Acinetobacter calcoaceticus* NRRL B-15847 or a mutant thereof.

4,883,758

BIOLOGICALLY PURE CULTURE OF THE MICROORGANISM *STREPTOMYCAS TROPOLOFACIENS* USED FOR PRODUCING 3,7-DIHYDROXYTROPOLONE AND ANTITUMOR USE

Hideo Kamei; Masaru Ohbayashi; Koji Tomita, all of Tokyo; Koko Sugawara, Wako, and Masataka Konishi, Kawasaki, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 927,203, Nov. 5, 1986. This application Jan. 6, 1989, Ser. No. 294,457
Int. Cl.[4] C12R *1/465*; C12P *7/26*
U.S. Cl. 435—253.5 **1 Claim**

1. A biologically pure culture of the microorganism *Streptomyces tropolofaciens* ATCC 53548, said culture being capable of producing 3,7-dihydroxytropolone in a recoverable quantity upon cultivation in an aqueous nutrient medium containing assimilable sources of carbon and nitrogen.

4,883,759

FERMENTATION METHOD AND APPARATUS

Thomas R. Hopkins, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 513,186, Jul. 12, 1983, Pat. No. 4,752,564. This application Mar. 6, 1986, Ser. No. 816,658
Int. Cl.[4] C12M *1/36, 1/08, 1/06, 1/02*
U.S. Cl. 435—289 **3 Claims**

1. Apparatus for the production of microbial cells from a microorganism, comprising:

closed vessel means having an upper end portion and a lower end portion for enclosing a microorganism;

means communicating with the interior of said vessel means for introducing nutrient medium and a carbon source into said vessel means;

means communicating with the interior of said vessel means for introducing oxygen into said vessel means;

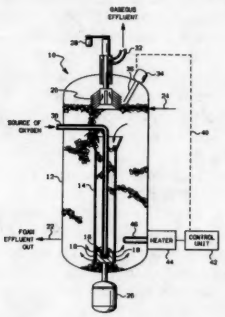
means disposed within said vessel means for maintaining said nutrient medium and said carbon source in a foamed condition within said vessel means;

foam enhancement means operatively related to said vessel means for causing a controlled quantity of microorganism constituents to be released from at least a portion of said

microorganisms in said vessel means to facilitate the maintenance of said nutrient medium and said carbon source in said foamed condition at a predetermined level;

foam sensing means at least partially disposed within the upper portion of said vessel means for providing an output signal responsive to the level of the foamed nutrient medium and carbon source in said vessel means;

control means operatively related to said foam sensing means and to said foam enhancement means for activating said foam enhancement means in response to a signal from



said foam sensing means responsive to a predetermined minimum level of the foamed nutrient medium and carbon source in said vessel means, and, alternately, for deactivating said foam enhancement means in response to a signal from said foam sensing means responsive to a predetermined maximum level of the foamed nutrient medium and carbon source in said vessel means; and

means communicating with the interior of said vessel means for withdrawing microbial cells produced in said vessel means.

4,883,760

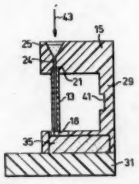
DEVICE FOR PERFORMING ENZYME IMMUNOASSAYS

Donald R. Heelies, Mississauga, Canada, assignor to Adi Diagnostics Inc., Rexdale, Canada

Filed Jun. 20, 1988, Ser. No. 209,332

Int. Cl.[4] C12M *1/24*

U.S. Cl. 435—296 **14 Claims**



1. A device for performing immunoassays, comprising:

a support structure for a transparent capillary assay tube, said tube having an internal surface to which is attached an antibody, antigen or hapten, the tube having an upper end attached to a lateral portion of the support structure so that the tube is suspended in an upright position having a lower end being free, the lateral portion defining a first aperture in flow communication with the upper end of the tube, and the support structure having an upright portion attached to the lateral portion, the upright portion being sufficiently resiliently flexible to allow downward deflection of the lateral portion, and hence, the tube upon application of moderate manual pressure; and

absorbent material positioned beneath the capillary tube and spaced from the lower free end thereof, said lower end being engageable with the absorbent material upon downward deflection of the support structure so that liquid contained in the capillary tube may be drawn into the absorbent material.

4,883,761

PERTUSSIS TOXIN GENE: CLONING AND EXPRESSION OF PROTECTIVE ANTIGEN

Jerry M. Keith, and Camille Locht, both of Hamilton, Mont., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Mar. 25, 1986, Ser. No. 843,727

Int. Cl.[4] C12N *1/00, 15/00, 1/20;* C07H *21/04*

U.S. Cl. 435—320 **3 Claims**

1. An isolated gene consisting essentially of DNA encoding pertussis toxin.

4,883,762

STABILIZED ISOENZYME CONTROL PRODUCTS

Michael K. Hoskins, Irvine, Calif., assignor to Ciba Corning Diagnostics Corp., Medfield, Mass.

Continuation of Ser. No. 47,048, May 6, 1987, abandoned, which is a division of Ser. No. 913,117, Sep. 29, 1986, Pat. No. 4,684,615, which is a continuation of Ser. No. 501,213, Jun. 6, 1983, abandoned. This application Jan. 12, 1989, Ser. No. 296,911

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.[4] G01N *31/00*

U.S. Cl. 436—18 **8 Claims**

1. An isoenzyme control reagent stabilized against disassociation or rearrangement of the subunits of the isoenzyme comprising:

(a) an isoenzyme;

(b) plexiform stabilizing means selected from the group consisting of reducing monosaccharide sugars and reducing disaccharide sugars, the plexiform stabilizing means present in the range of about 2% to 8% weight per volume, and

(c) human sera having the lipids removed therefrom.

4,883,763

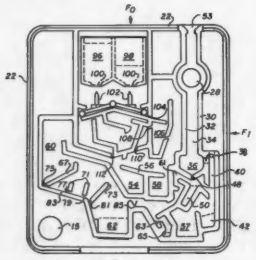
SAMPLE PROCESSOR CARD FOR CENTRIFUGE

James T. Holen, Mundelein, and Vidas P. Kazlauskas, Waukegan, both of Ill., assignors to Abbott Laboratories, Chicago, Ill.

Continuation of Ser. No. 882,734, Jul. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 861,477, May 9, 1986, abandoned, which is a continuation of Ser. No. 606,785, May 3, 1984, abandoned. This application Sep. 30, 1988, Ser. No. 253,370

Int. Cl.[4] G01N *21/84*; B01L *3/00*

U.S. Cl. 436—45 **21 Claims**



1. A sample processor card for carrying out chemical tests under centrifugal force, said centrifugal force being applied in at least two directions relative to said card by the orientation of the card on a centrifuge rotor, said card comprising:

means defining an outer enclosure having a plurality of walls defining therein:

(a) inlet means for supplying a sample to the card, sample measuring chamber means communicating with said inlet means to measure a volume of sample, and a sample overflow means communicating with the inlet means and the sample measuring chamber means, said sample measuring chamber means and said sample overflow means being disposed such that centrifugal force acting in a first direction relative to said card moves sample into said sample measuring chamber means, with excess sample moving into said sample overflow means;

(b) reagent containing means for supplying at least one reagent;

(c) mixing chamber means communicating with said sample measuring chamber means and said reagent containing means and disposed such that centrifugal force acting on the card in a second direction relative to the card admits said measured volume of sample and said reagent into said mixing chamber means; and

(d) cuvette means communicating with the mixing chamber means;

wherein said sample measuring chamber means, said reagent containing means, said mixing chamber means and said cuvette means are arranged in said enclosure such that movement of sample or reagent among said sample measuring chamber means, said reagent containing means, said mixing chamber means and said cuvette means can be accomplished solely by changing the orientation of the processor card relative to a centrifuge rotor without substantially lowering the magnitude of centrifugal force.

15. A method for carrying out chemical tests under centrifugal force on a centrifuge rotor, comprising the steps of:

(a) supplying a sample to be tested to a sample processor card having

(1) inlet means for supplying a sample to the card, sample measuring chamber means communicating with said inlet means to measure a volume of sample, and a sample overflow means communicating with the inlet means and the sample measuring chamber means, said sample measuring chamber means and said sample overflow means being disposed such that centrifugal force acting in a first direction relative to said card moves sample into said sample measuring chamber means, with excess sample moving into said sample overflow means;

(2) reagent containing means for supplying at least one reagent;

(3) mixing chamber means communicating with said sample measuring chamber means and said reagent containing means and disposed such that centrifugal force acting on the card in a second direction relative to the card admits said measured volume of sample and said reagent into said mixing chamber means; and

(4) cuvette means communicating with the mixing chamber means;

(b) subjecting the card to a substantially uniform and continuous centrifugal force acting in a first direction relative to the card to move sample into said sample measuring chamber means, with excess sample moving into said sample overflow means;

(c) reorienting the card relative to a centrifuge rotor to change the effective direction of centrifugal force acting thereon to a second direction, thereby to contact the sample with reagent and effect a chemical reaction therebetween, said contact being accomplished solely by changing the relative direction of centrifugal force and without substantially lowering the magnitude of centrifugal force; and

(d) measuring the reaction product of the sample and reagent.

4,883,764

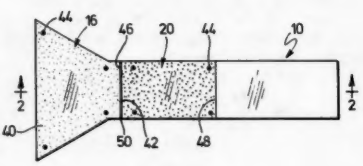
BLOOD TEST STRIP

Mary A. Kloepfer, 10930 Braewick Dr., Carmel, Ind. 46032

Filed Jul. 20, 1987, Ser. No. 75,391

Int. Cl.[4] G01N *33/48*, *31/22*

U.S. Cl. 436—63 **25 Claims**



20. A method for separating plasma from whole blood comprising:

providing a blood test strip including

(1) a support member,

(2) a generally sheet-like separating member, and

(3) a generally sheet-like recipient member, the recipient member being disposed in a generally co-planar, side-by-side, non-interwoven relation with the separating member to define an incision therebetween, the recipient member having a defined absorptive capacity,

applying a quantity of blood to the separating member in excess of the combined absorptive capacities of the separating member and recipient member,

permitting the blood to flow in the separating and recipient members,

collecting a defined volume of plasma on the recipient member, and

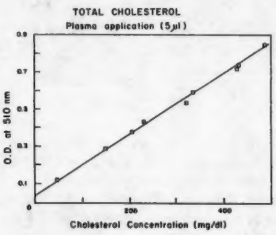
retaining the cellular components of the blood in the separating member.

4,883,765

METHOD FOR THE QUANTITATIVE DETERMINATION OF LIPOPROTEIN COMPONENTS IN A BODY FLUID AND METHOD FOR SEPARATING LIPOPROTEINS FROM BLOOD

Ilana Tamir, Jerusalem; Ben-Zion Kidron, Givat; Lynn Wang, Gilo, and Michael Inbar, Mazkeret Batya, all of Israel, assignors to I.D.L. Int'l Diagnostic Laboratories Ltd., Jerusalem, Israel

Filed Aug. 28, 1987, Ser. No. 91,218
Claims priority, application Israel, Sep. 4, 1986, 79945
Int. Cl.[4] G01N *33/92*
U.S. Cl. 436—71 10 Claims



1. A method for the quantitative determination of total cholesterol in a sample of whole blood, which method comprises:

(a) contacting said sample with a quantity of particulate silica which is capable of selectively absorbing all lipoproteins in said sample;

(b) separating the non-absorbed components of the sample from the silica with said lipoproteins absorbed thereon;

(c) after step (b), releasing said lipoproteins absorbed to said silica; and

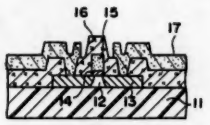
(d) quantitatively determining the total cholesterol in said lipoproteins.

4,883,766

METHOD OF PRODUCING THIN FILM TRANSISTOR

Mamoru Ishida, Yokohama; Shunichi Isaki, Toyonaka; Yoshikazu Akiyama, and Mitsuhiro Kohata, both of Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo and Ricoh Research Institute of General Electronics, Natori, both of, Japan

Filed Nov. 10, 1988, Ser. No. 269,452
Claims priority, application Japan, Nov. 14, 1987, 62-288193
Int. Cl.[4] H01L *29/78, 27/12*
U.S. Cl. 437—40 20 Claims



1. A method of producing a thin film transistor comprising the steps of:

preparing a structure having a substrate, an active layer and a diffusion layer formed on the substrate, and a gate electrode formed on the active layer;

forming on said structure an interlayer insulator layer made of a silicon oxide hydrate (SiO_xH_y) having a predetermined composition;

forming contact holes in said interlayer insulator layer;

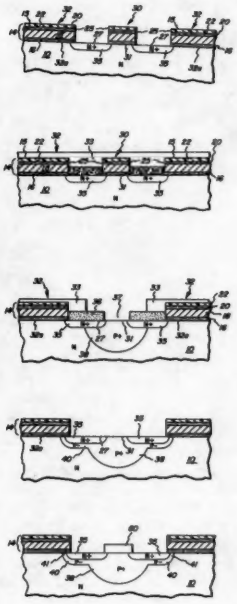
forming a wiring layer on said interlayer insulator layer; and carrying out a thermal process thereby diffusing hydrogen atoms within said interlayer insulator layer into at least said active layer and said diffusion layer.

4,883,767

METHOD OF FABRICATING SELF ALIGNED SEMICONDUCTOR DEVICES

Peter V. Gray, Scotia; Bantval J. Baliga, Schenectady, both of N.Y.; Mike F. S. Chang, Cary, N.C., and George C. Pifer, North Syracuse, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 938,693, Dec. 5, 1986, abandoned. This application Jul. 14, 1988, Ser. No. 220,353
Int. Cl.[4] H01L *21/265*
U.S. Cl. 437—41 61 Claims



1. A method of fabricating a self aligned semiconductor device comprising the steps of:

(a) providing a semiconductor substrate having a major surface;

(b) providing a first protective layer atop said substrate surface;

(c) opening a first window through a first portion of said protective layer, said first window having an inner perimeter and an outer perimeter and encompassing a second portion of said first protective layer

(d) introducing a first dopant into said substrate through said first window to establish a first doped region, said first doped region being self aligned with respect to said first window;

(e) forming a second protective layer over said substrate in said first window;

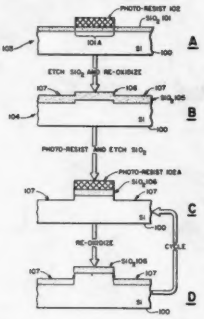
(f) opening a second window by removing said second portion of said first protective layer;
(g) introducing a second dopant into said substrate through said second window to establish a second doped region, said second doped region being self aligned with respect to said inner perimeter of said first window;
(h) opening a third window through said second protective layer to expose a portion of said first doped region; and
(i) introducing a third dopant through said third window into said first region to establish a third region, said third doped region being self aligned with respect to the outer perimeter of said first window.

4,883,768

MESA FABRICATION IN SEMICONDUCTOR STRUCTURES

James L. Swindal, East Hampton, and Daniel H. Grantham, Glastonbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 28, 1989, Ser. No. 317,309
Int. Cl.[4] H01L *29/06*
U.S. Cl. 437—61 **5 Claims**



1. A method of fabricating a mesa in a semiconductor structure, comprising the following step(s):
(a) fabricating the mesa in an oxidation process applied in a cyclical fashion, with each cycle including a photolithographic operation protecting the previously grown oxide on the mesa from etching while exposing the areas surrounding the mesa to etching; and
(b) during each cycle growing less oxide and conversely consuming less silicon on the mesa than in the preceding cycle, while growing substantially equal amounts of oxide on the non-mesa areas surrounding the mesa in each cycle, causing the top of the mesa to get higher above the surrounding areas in each cycle in comparison to the preceding cycle.

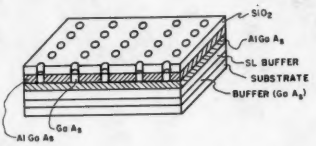
4,883,769

METHOD OF MAKING A MULTIDIMENSIONAL QUANTUM-WELL ARRAY

Thomas R. Au Coin, Ocean Township, Ocean County; Walter D. Braddock IV, and Gerald J. Iafrate, both of Toms River, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 18, 1988, Ser. No. 234,089
Int. Cl.[4] H01L *21/20, 21/225*
U.S. Cl. 437—110 **6 Claims**

1. Method of making a multidimensional quantum-well array from a single crystal wafer of gallium arsenide as the substrate including the steps of:
(A) epitaxially depositing a film of about 5000 Å of gallium arsenide onto the top surface of the substrate,
(B) depositing thereover a superlattice buffer of ten periods of approximately 100 Å of gallium arsenide and 15 Å of gallium aluminum arsenide,
(C) epitaxially depositing about 5000 Å of gallium arsenide onto the superlattice buffer,
(D) epitaxially depositing about 1000 Å of gallium aluminum arsenide thereover,
(E) epitaxially depositing about 500 Å of gallium arsenide thereover,
(F) depositing about 500 Å of silicon dioxide thereover,
(G) spinning an electron-beam sensitive resist onto the silicon dioxide film to a thickness of about 1000 to 2000 Å and



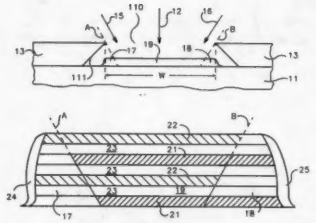
exposing the resist to an electron beam focused properly and of sufficient flux to produce an array of circularly exposed areas of about 500 Å diameter,
(H) developing the exposed areas to open circular holes of about 500 Å in diameter on the surface of the deposited silicon dioxide,
(I) etching circular holes in the silicon dioxide layer,
(J) stripping the e-beam resist from the silica layer and placing the resulting sample in a suitable annealing furnace, and
(K) heating the sample to about 900° C. for about 15 seconds and then cooling.

4,883,770

SELECTIVE NIPI DOPING SUPER LATTICE CONTACTS AND OTHER SEMICONDUCTOR DEVICE STRUCTURES FORMED BY SHADOW MASKING FABRICATION

Gottfried H. Dohler, Palo Alto; Ghulam Hasnain, Mtn. View, and Jeffrey N. Miller, Los Altos, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 909,734, Sep. 19, 1986, abandoned. This application Jan. 17, 1989, Ser. No. 298,794
Int. Cl.[4] H01L *21/20, 21/203*
U.S. Cl. 437—110 **11 Claims**



1. A semiconductor fabrication process comprising the steps of:
(a) exposing a substrate by a plurality of molecular beams to produce a epitaxially grown layer on the substrate, said beams being directed along a plurality of directions; and
(b) blocking at least one beam with a mask having therein at least one aperture that enables a first of said beams to expose the substrate only in a first region and a second region and that enables a second of said beams to expose the substrate only in the second region and in a third region, said three regions being nonoverlapping and said second region being contiguous to the first and third regions, said beams being selected to form a first type of

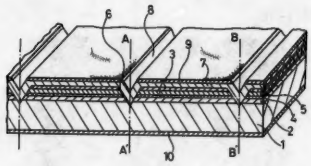
selective contact from the first region to the second region and form a second type of selective contact form the third region to the second region.

4,883,771

METHOD OF MAKING AND SEPARATING SEMICONDUCTOR LASERS

Hisao Kumabe, and Wataru Susaki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Division of Ser. No. 119,340, Nov. 10, 1987, Pat. No. 4,841,532. This application Mar. 31, 1989, Ser. No. 331,359
Claims priority, application Japan, Nov. 13, 1986, 61-270695
Int. Cl.[4] H01L *21/20, 21/302*
U.S. Cl. 437—129 **10 Claims**



1. A method for making a semiconductor laser comprising:

sequentially depositing on a semiconductor substrate a first semiconductor cladding layer of a first conductivity type, an active semiconductor layer having a first energy band gap, a second semiconductor cladding layer of a second conductivity type opposite said first conductivity type, a fourth semiconductor layer of said second conductivity type as a contacting layer;

forming at least one V shaped groove in said layers extending from said second cladding layer into at least part of said first cladding layer to expose said active layer;

growing a fifth semiconductor layer of said second conductivity type in said groove to cover at least said active layer and said second cladding layer while retaining said groove shape; and

cleaving said substrate and layers along said groove to expose a resonator end surface and form a semicondctor laser having a non-absorbing mirror structure at at least one of its resonator end surfaces.

4,883,772

PROCESS FOR MAKING A SELF-ALIGNED SILICIDE SHUNT

James M. Cleeves, Redwood City, and James G. Heard, Cupertino, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Continuation of Ser. No. 122,523, Nov. 18, 1987, abandoned, which is a continuation of Ser. No. 906,350, Sep. 11, 1986, abandoned. This application Sep. 6, 1988, Ser. No. 241,784
Int. Cl.[4] H01L *21/283*
U.S. Cl. 437—200 **12 Claims**

1. A process for fabricating a low resistance shunt for a silicon semiconductor structure comprising:

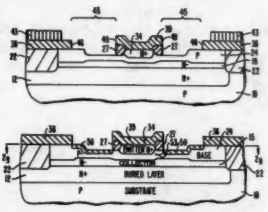
on a layer of first conductivity type silicon semiconductor material having a surface, forming a masking region over a first portion of the surface but not over a second portion;

oxidizing the second portion to form an insulating region of oxidized silicon semiconductor material to separate at the surface the first portion of the layer from the second portion, the insulating region encroaching beneath the masking region to thereby reduce the size of the first portion;

in predetermined order (a) removing the masking region and (b) introducing opposite conductivity type impurity into the first portion to thereby form a first region;

subsequently forming a first electrical connection to the first region, which connection extends at least over the part of the insulating region which was encroaching beneath the masking region;

forming a second electrical connection over the layer of first conductivity type semiconductor material, which second electrical connection is spaced apart from the first electrical connection;



using the first and second electrical connections as a mask, removing a part of the insulating region to expose the surface of the first conductivity layer while leaving at least that portion of the insulating layer encroaching beneath the masking region; and

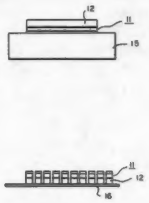
depositing a silicide-forming metal onto at least the surface of the layer to form a low resistance shunt of metal silicide between said first and second electrical connections.

4,883,773

METHOD OF PRODUCING MAGNETOSENSITIVE SEMICONDUCTOR DEVICES

Takuro Ishikura, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 126,556, Nov. 30, 1987, abandoned. This application Mar. 7, 1989, Ser. No. 320,911
Claims priority, application Japan, Dec. 16, 1986, 61-300678
Int. Cl.[4] H01L *43/06, 43/14*
U.S. Cl. 437—207 **6 Claims**



1. A method of producing magnetosensitive semiconductor devices comprising the steps of

forming a magnetosensitive part on a first surface of a semiconductor substrate,

pasting a supporting member on said first surface of said semiconductor substrate,

reducing the thickness of said semiconductor substrate to less than and about equal to 100 micrometers from a second surface thereof with said supporting member kept on said first surface, said first and second surfaces being opposite from each other and said magnetosensitive part not appearing on said second surface,

pasting a magnetic substrate of thickness about 300 micrometers on said second surface of said semiconductor substrate to form a layered structure,

thereafter removing said supporting member and attaching an adhesive tape on said magnetic substrate,

thereafter dividing said layered structure into individual unistructural elements each having a semiconductor chip and a magnetic piece, and

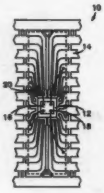
die bonding, wire bonding and resin molding said individual elements.

4,883,774

SILVER FLASHING PROCESS ON SEMICONDUCTOR LEADFRAMES

Frank Djennas, Mesa, and Curtis W. Mitchell, Scottsdale, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 21, 1988, Ser. No. 171,097
Int. Cl.[4] H01L *21/44*
U.S. Cl. 437—211 12 Claims



1. A process for flashing a thin layer of silver on metal semiconductor leadframes comprising the steps of:

providing a metal leadframe;

placing said metal leadframe, unmasked, into a cleaning bath, said cleaning bath including silver in solution and having no outside electrical driving force; and

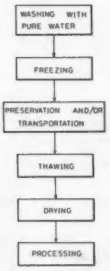
removing said metal leadframe from said cleaning bath following plating of a predetermined thin layer of silver on said entire metal leadframe.

4,883,775

PROCESS FOR CLEANING AND PROTECTING SEMICONDUCTOR SUBSTRATES

Masanori Kobayashi, Meguro, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 10, 1987, Ser. No. 131,072
Claims priority, application Japan, Dec. 17, 1986, 61-302118
Int. Cl.[4] H01L *2/314*
U.S. Cl. 437—225 8 Claims



1. A process for cleaning and protecting semiconductor substrates, comprising the steps of:

washing a cleaned semiconductor substrate with pure water, while keeping said substrate in the pure water,

freezing the pure water to cover surfaces of the substrate with ice, said freezing being continuously carried out by keeping said substrate submerged in the pure water without exposing said substrate to the atmosphere during the period between the washing step and the freezing step,

preserving and/or transporting the ice-covered substrate,

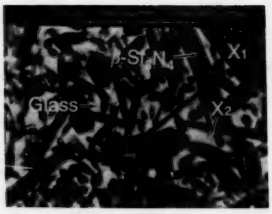
just before a subsequent processing, thawing and drying the ice-covered substrate.

4,883,776

SELF-REINFORCED SILICON NITRIDE CERAMIC OF HIGH FRACTURE TOUGHNESS AND A METHOD OF PREPARING THE SAME

Aleksander J. Pyzik, Midland; William J. Dubensky, Traverse City; Douglas B. Schwarz, Midland, and Donald R. Beaman, Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 27, 1988, Ser. No. 148,748
Int. Cl.[4] C04B *35/58*
U.S. Cl. 501—10 15 Claims



15. A process for preparing a silicon nitride ceramic body having a fracture toughness greater than about 6 MPa $(m)^{\frac{1}{2}}$ and containing predominantly β-silicon nitride whiskers having an average aspect ratio of at least about 2.5, the process comprising:

preparing a powder mixture comprising

(a) silicon nitride in an amount sufficient to provide a ceramic body;

(b) magnesium oxide in an amount of from about 1.0 to about 20.6 weight percent based upon total weight of the powder mixture, said amount being sufficient to promote densification of the powder;

(c) yttrium oxide in an amount of from about 0.7 to about 28.3 weight percent based upon total weight of the powder mixture, said amount being sufficient to promote the essentially complete conversion of the silicon nitride to β-silicon nitride; and

(d) calcium oxide in an amount of from about 0.01 to about 5.3 weight percent based upon total weight of the powder mixture, said amount being sufficient to promote the formation of β-silicon nitride whiskers,

and hot-pressing the powder under conditions such that densification and in situ formation of β-silicon nitride whiskers having an average aspect ratio of at least about 2.5 occur and such that the silicon nitride ceramic body having a fracture toughness greater than about 6 MPa $(m)^{\frac{1}{2}}$ is formed.

4,883,777

SEALING GLASS COMPOSITION WITH FILLER CONTAINING FE AND W PARTIALLY SUBSTITUTED FOR TI IN $PBTIO_3$ FILLER

Toshio Yamanaka, Shiga, Japan, assignor to Nippon Electric Glass Company, Limited, Shiga, Japan

Filed Apr. 5, 1989, Ser. No. 333,450
Claims priority, application Japan, Apr. 7, 1988, 63-86909
Int. Cl.[4] C03C *3/12*
U.S. Cl. 501—15 4 Claims

1. In a sealing glass composition, as used for sealing members in electronic parts, consisting of a mixture which comprises solder glass powder of a low melting temperature and low expansion coefficient filler powder, the improvement wherein said filler powder comprises a ceramic powder which consists,

by weight, of PbO 65–75 %, TiO_2 10–25%, Fe_2O_3 1–10%, WO_3 1–12%, and CaO 0–5%.

4,883,778

PRODUCTS FORMED OF A CERAMIC-GLASS-METAL COMPOSITE

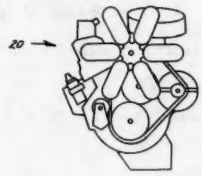
Narendra N. SinghDeo, New Haven; Deepak Mahulikar, Meriden, both of Conn., and Sheldon H. Butt, Godfrey, Ill., assignors to Olin Corporation, New Haven, Conn.

Filed Oct. 30, 1986, Ser. No. 924,959

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.[4] C03C *8/18, 14/00*

U.S. Cl. 501—19 **15 Claims**



1. An engineering ceramic product formed from a ceramic-glass-metal composite, comprising:

from about 5 to about 45 volume percent of metallic particles for enhancing the flow characteristics of said composite, said metallic particles selected from the group consisting of aluminum, copper, iron, silver, gold, stainless steel and alloys thereof;

from about 15 to about 50 volume percent of a glass for adhering said composite together; and

the balance essentially ceramic particles, said ceramic particles selected from the group consisting of Al_2O_3, SiC, BeO, TiO_2, ZrO_2, MgO, AlN, Si_3N_4, BN and mixtures thereof;

said composite having a structure comprising substantially a matrix of said glass with said ceramic and metallic particles dispersed therein.

4,883,779

CERAMIC ARTICLES CONTAINING SILICON CARBIDE

Jerome W. McAllister, Hudson, Wis.; Lien-Huong T. Pham, St. Paul, and Harold G. Sowman, Stillwater, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 912,830, Sep. 26, 1986, Pat. No. 4,800,180. This application Oct. 20, 1988, Ser. No. 260,283

Int. Cl.[4] C04B *35/52*

U.S. Cl. 501—88 **14 Claims**

1. A method for preparing a ceramic shaped article having a ceramic matrix and dipersed therein silicon carbide, the method comprising the steps of:

(a) preparing a mixture of viscous precursor liquids comprising at least one ceramic precursor sol and crystalline silicon carbide particles have an average diameter of at most 0.1 micrometer,

(b) shaping said viscous concentrate into a shaped form,

(c) means for providing a green shaped article from said shaped form,

(d) heating and firing the green shaped article to remove moisture and fugitive constituents and provide a refractory shaped article,

wherein said article has a modulus of elasticity (E) value of at least 10 percent greater than the inherent modulus of elasticity (E) value of the fully dense host matrix.

4,883,780

ALUMINUM NITRIDE SINTERED BODY AND PREPARATION THEREOF

Mituo Kasori, Kawasaki; Kazuo Shinozaki, Inagi; Kazuo Anzai, Tokyo; Akihiko Tsuge; Hiroshi Imagawa, both of Yokohama; Takeshi Takano, Samukawa; Fumio Ueno, Kawasaki; Akihiro Horiguchi, Yokohama, and Hiroshi Inoue, Kawaguchi, all of Japan, assignors to Kabushiki Kaisha toshiba, Kawasaki, Japan

Continuation of Ser. No. 878,601, Jun. 26, 1986, abandoned. This application Feb. 11, 1988, Ser. No. 157,150

Claims priority, application Japan, Jun. 28, 1985, 60-140166; Sep. 25, 1985, 60-211401; Sep. 25, 1985, 60-211403; Jan. 21, 1986, 61-9010

Int. Cl.[4] C04B *35/58, 35/50*

U.S. Cl. 501—96 **8 Claims**

1. An aluminum nitride sintered body prepared by sintering aluminum nitride and additives, which consists essentially of

(a) aluminum nitride,

(b) at least one compound selected from the group consisting of an aluminum compound of a rare earth metal, an aluminum compound of an alkaline earth metal, and an aluminum compound of a rare earth metal and an alkaline earth metal, and

(c) at least one element selected from the transition elements consisting of hafnium, molybdenum, tungsten, the Group Va elements, the Group VIIa elements and the Group VIII elements, and/or at least one compound comprising said element, wherein the content of constituent (b) is 0.01 to 18% by weight in terms of respective oxides of said rare earth and/or alkaline earth metal, and wherein the content of constituent (c) is 0.01 to 15% by weight in terms of oxide of said transition element.

4,883,781

HEAT RESISTING LOW EXPANSION ZIRCONYL PHOSPHATE-ZIRCON COMPOSITE

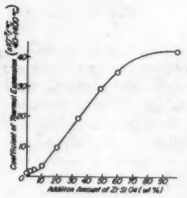
Keiichiro Watanabe, and Tsuneaki Ohashi, both of Nagoya, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Sep. 9, 1987, Ser. No. 94,743

Claims priority, application Japan, Sep. 13, 1986, 61-215010; May 28, 1987, 62-129873; May 28, 1987, 62-129874

Int. Cl.[4] C04B *35/16, 35/48*

U.S. Cl. 501—102 **19 Claims**



1. A heat resisting low expansion zirconyl phosphate-zircon composite body having microcracks therein and containing zirconyl phosphate and zircon as a main crystalline phase and a secondary crystalline phase, respectively, said body having a chemical composition consisting essentially of 58.2 to 65.4% by weight ZrO_2, 17.4 to 37.1% by weight of P_2O_5 and 1.5 to 19% by weight of SiO_2, said body having a coefficient of thermal expansion in a temperature range from room temperature to 1,400° C. of not more than 30×10^{-7}/°C., a melting point of not less and 1,600° C. and a self-weight softening percentage of not more than 0.1%.

4,883,782

COBALT-MOLYBDENUM THIN FILM CATALYST

James R. Brown, Kanata; Norman S. McIntyre, London, and Darlene D. Johnston, Komoka, all of Canada, assignors to Energy, Mines and Resources-Canada, Ottawa, Canada

Filed Jul. 5, 1988, Ser. No. 215,295
Int. Cl.[4] B01J *27/049, 27/051*
U.S. Cl. 502—220 7 Claims

1. A thin film catalyst structure comprising:

(a) an aluminum base having an oxidized surface layer thereon, and

(b) sequentially deposited thin films of metallic cobalt and molybdenum on said oxidized layer, said cobalt and molybdenum films having been calcined and sulphided to thereby form catalytically active Co—Mo—S species at the outer surface of the catalyst.

4,883,783

COMPOSITION OF MATTER FOR CONVERSION OF HYDROCARBONS

Emmett H. Burk, Jr., Mountain Home, Ark.; Jin S. Yoo, Flossmoor, and Cecelia A. Radlowski, Riverside, both of Ill., assignors to UOP, Des Plaines, Ill.

Division of Ser. No. 48,623, May 11, 1987, Pat. No. 4,735,705, which is a continuation of Ser. No. 615,184, May 30, 1984, abandoned. This application Dec. 31, 1987, Ser. No. 140,126
Int. Cl.[4] B01J *21/02, 21/10, 23/10, 23/58*
U.S. Cl. 502—304 12 Claims

1. A composition of matter comprising, in intimate admixture, a major amount of solid particles capable of promoting hydrocarbon conversion at hydrocarbon conditions and a minor amount of discrete entities having a composition different from said solid particles and comprising at least one magnesium-aluminum-containing spinel, and a minor amount of at least one added component selected from the group consisting of alkali metal components, calcium components, barium components, strontium components, beryllium components and mixtures thereof, said discrete entities being present in an amount sufficient to reduce the amount of sulfur oxides in an effluent flue gas.

4,883,784

HUMAN COMPLEMENT FACTORS AND THEIR THERAPEUTIC USE

Isao Kaneko, Tokyo, Japan, assignor to Sankyo Company Limited, Tokyo, Japan

Continuation of Ser. No. 927,733, Nov. 5, 1986, abandoned. This application Apr. 13, 1988, Ser. No. 181,309
Claims priority, application Japan, Nov. 8, 1985, 60-250187
Int. Cl.[4] A61K *37/04, 37/43*
U.S. Cl. 514—8 9 Claims

1. A method of treating a mammal suffering from a disease selected from the group consisting of systemic lupus erythematosus, rheumatoid arthritis and glomerulonephritis by administering to said mammal an effective amount of a complement factor selected from the group consisting of Factor H, Factor I and mixtures of Factor H and Factor I.

4,883,785

COMPLEX OF ANTI-FUNGAL AGENT AND CYCLODEXTRIN AND METHOD

Wing-Sun Chow, 26 Marquette Rd., Upper Montclair, N.J. 07043; Shirley C. Chen, 91 George Ave., Edison, N.J. 08820, and Peter Timmins, 34, Thornley Road, Morton, Wirral, Merseyside, United Kingdom (L46 6HB)

Filed Jul. 27, 1984, Ser. No. 635,030
Int. Cl.[4] A61K *31/70;* C07H *17/08*
U.S. Cl. 514—31 7 Claims

1. An anti-fungal complex having improved water-solubility and stability comprising a polyene anti-fungal agent selected from the group consisting of amphotericin B, candicidin, hamycin, and pimaricin and β- or γ-cyclodextrin in a molar ratio of anti-fungal agent to cyclodextrin of within the range of from about 1:2 to about 1:100.

4. An anti-fungal composition comprising an effective amount of an anti-fungal complex as defined in claim 1 and a pharmaceutically acceptable carrier therefor.

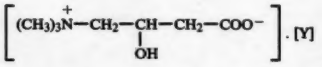
4,883,786

DERIVATIVES OF L-CARNITINE

Laura Puricelli, Brescia, Italy, assignor to Magis Farmaceutici Srl, Brescia, Italy

Continuation of Ser. No. 124,405, Nov. 20, 1987, abandoned, which is a continuation of Ser. No. 750,253, Jul. 1, 1985, abandoned. This application Dec. 8, 1988, Ser. No. 282,938
Claims priority, application Italy, Jun. 29, 1984, 21655 A/84
Int. Cl.[4] C07C *101/30;* A61K *31/19*
U.S. Cl. 514—47 2 Claims

1. A derivative of L-carnitine of the formula:



wherein Y is the monopotassium salt of an acid selected from the group consisting of: phosphoric acid, aspartic acid, acetylaspartic acid, glutamic acid, acetylglutamic acid, glutaric acid, β-keto-glutaric acid, orotic acid, succinic acid, phosphoserine, acetylphosphoserine, malic acid, pamoic acid and adenosinetriphosphoric acid.

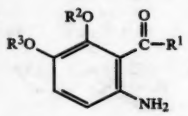
4,883,787

PROCESS FOR PREPARING 2-ACYL-3, 4-DIALKOXYANILINES

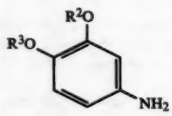
Richard A. Conley, Annandale, and Donald L. Barton, Frenchtown, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Division of Ser. No. 98,821, Sep. 21, 1987, which is a division of Ser. No. 760,003, Jul. 29, 1985, Pat. No. 4,731,480. This application Jun. 20, 1988, Ser. No. 209,130
Int. Cl.[4] C07C *103/38*
U.S. Cl. 564—414 6 Claims

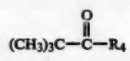
1. A method for preparing a compound of the formula



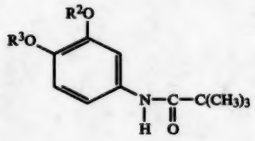
which comprises reacting a substituted aniline of the formula



with a pivalic acid compound of the formula



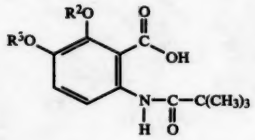
to form an anilide of the formula



reacting the anilide first with an organolithium compound of the formula

R—Li

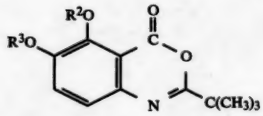
and reacting the product formed with carbon dioxide to form an anilide of the formula



reacting the anilide with an acid anhydride of the formula

$(R_5CO)_2O$

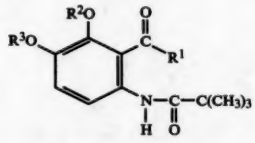
to form a 1,3-benzoxazin-4-one of the formula



reacting the 1,3-benzoxazin-4-one with an organometallic reagent of the formula

R_1M

to form an anilide of the formula



and hydrolyzing the anilide with acid, wherein R_1, R_2, R_3 and R_5 are lower alkyl and R_2 and R_3 when taken together are methylenedioxy; R_4 is chloro, bromo, fluoro or $OCOC(CH_3)_3$; R is n-butyl, s-butyl or t-butyl and M is Li and MgX wherein X is chloro or bromo.

4,883,788

METHOD AND COMPOSITION FOR REDUCING SERUM CHOLESTEROL

Charles E. Day, Fulton, Mich., and Eric H. Kuhrts, Santa Barbara, Calif., assignors to Hauser-Kuhrts, Inc., Santa Barbara, Calif.

Continuation of Ser. No. 871,715, Jun. 6, 1986, Pat. No. 4,824,672. This application Sep. 23, 1988, Ser. No. 191,285

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

Int. Cl.[4] A61K *31/715, 33/14, 33/10*

U.S. Cl. 514—57 **7 Claims**

1. An orally-administrable pharmaceutical composition for use in reducing serum cholesterol levels consisting essentially of:

(a) an effective amount of guar gum which exhibits cholesterol-reducing activity, and

(b) a dispersibility-enhancing amount of an orally-ingestible non-toxic pharmacologically-acceptable mineral salt capable of dissolution in the gastric fluid with release of a gas, the ratio of guar gum to said mineral salt being in the range of approximately 3:1 to approximately 10:1.

4,883,789

SUBSTITUTED PHENYLTRIALKYLSILANE INSECTICIDES

Scott M. Sieburth, Princeton, N.J., assignor to FMC Corporation, Philadelphia, Pa.

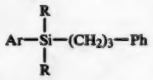
Continuation-in-part of Ser. No. 869,797, Jun. 2, 1986, Pat. No. 4,709,068. This application Feb. 9, 1987, Ser. No. 12,410

The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.

Int. Cl.[4] A60K *31/695;* **C07F** *7/08, 7/10*

U.S. Cl. 514—63 **18 Claims**

1. A compound of the formula



in which Ar is phenyl, furanyl, thienyl, or thiazolyl, each optionally substituted with (C_{1-4})alkyl, halo, (C_{1-4})haloalkyl, (C_{1-4})alkoxy, (C_{1-4})haloalkoxy, or a substituent having the structure —A—$(CR^1)_n$—A—, where R^1 is independently 1 or 2 hydrogens, halogens, or alkyls, n is 1 or 2, and each A is O, S, or CH_2 and is bonded to an adjacent carbon atom of the aromatic ring; R is a (C_{1-4}) alkyl; and Ph is phenoxyphenyl, benzylphenyl, phenyliminophenyl, benzoylphenyl, or benzodioxolyl, each optionally substituted with halogen or lower alkyl.

18. A method for controlling insects by application to the locus where control is desired an insecticidally effective amount of a compound of claim 1.

4,883,790

WAVELENGTH-SPECIFIC CYTOTOXIC AGENTS

Julia G. Levy; David Dolphin, both of Vancouver, and Jack K. Chow, Burnaby, all of Canada, assignors to University of British Columbia, Vancouver, Canada

Continuation-in-part of Ser. No. 5,204, Jan. 20, 1987. This application Apr. 23, 1987, Ser. No. 41,680

Int. Cl.[4] A61K *31/66*

U.S. Cl. 540—145 **11 Claims**

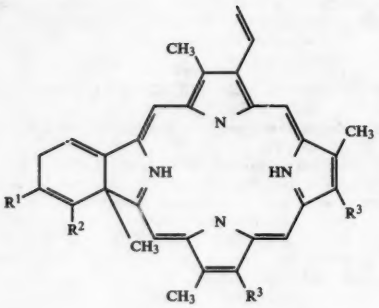
1. A method to impair the functioning of target cells to which a hydro-monobenzoporphyrin (Gp) having a light absorption maximum between 670–720 nm is attracted, which method comprises

administering to a mammal in need of such treatment an effective amount of said Gp; and

irradiating said target cells with radiation having a wavelength contained in the range of 670–720 nm,

wherein the Gp is selected from the group consisting of

1



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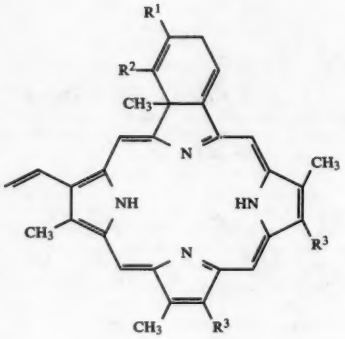

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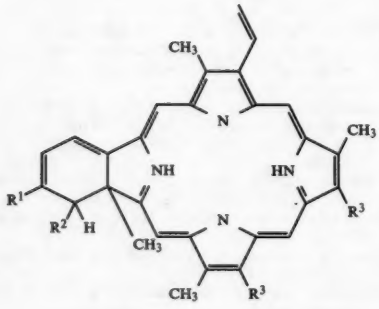

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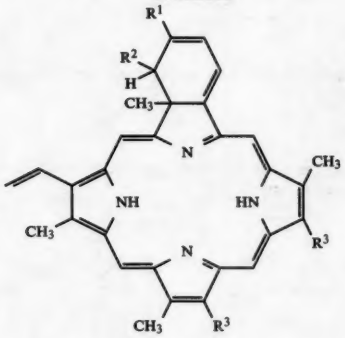

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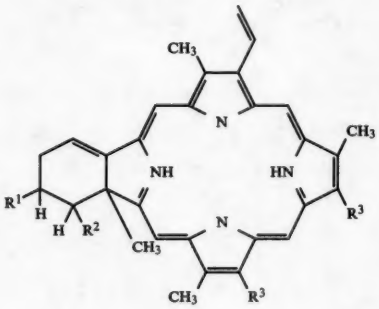

and

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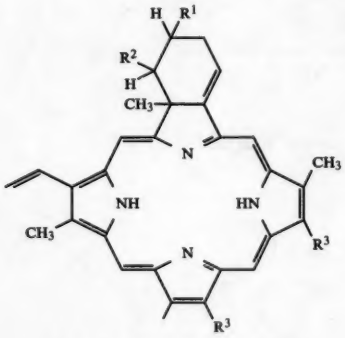


wherein each R^3 is independently [2-carboxyethyl or a derivative thereof] lower alkyl (1–4C) or omegacarboxy-alkyl (2–6C) or the esters (1–6C) or amides (1–10C) thereof; and

each R^1 and R^2 is independently selected from the group consisting of carboxy, carbalkoxy (1–6C), alkyl (1–6C) sulfone, and aryl.

4,883,791

25S,26-DIHYDROXYCHOLECALCIFEROL IN THE TREATMENT OF HYPERCALCITRIOLEMIC DISEASE STATES

Charles Y. C. Pak, Dallas, Tex.; Milan R. Uskokovic, Upper Montclair, N.J., and Joseph E. Zerwekh, Ovilla, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex. and Hoffman-LaRoche, Inc., Nutley, N.J.

Filed Sep. 21, 1987, Ser. No. 99,191
Int. Cl.[4] A61K *31/59*
U.S. Cl. 514—167 7 Claims

1. A method for the treatment of hypercalcitriolemic disease states which comprises administering an effective amount of 25S,26-dihydroxycholecalciferol to a host in need of such treatment.

4,883,792

STEROID CREAM FORMULATION

Peter Timmins, 6 Copse Grove, Irby, Wirral, Merseyside, L61 4YP, and Nicholas I. Payne, 50 Romsey Avenue, Fareham, Hants, PO16 9TA, both of United Kingdom

Filed Jan. 17, 1989, Ser. No. 297,159
Int. Cl.[4] A61K *9/06, 31/58*
U.S. Cl. 514—169 20 Claims

1. A tipredane and antifungal agent cream formulation having enhanced chemical and physical stability comprising solubilized tipredane, and a vehicle comprising a solubilizer for tipredane, water, at least one emulsifier which includes glyceryl monostearate, at least one buffer, a high melting point wax to impart desired consistency and heat storage stability to the cream formulation, one or more emollients including isopropyl stearate or isopropyl palmitate, and mixtures thereof with one or more metal chelating agents, and mixtures thereof with one or more lubricants, and mixtures thereof with one or more antioxidants or preservatives, and mixtures thereof with one or more antifungal agents, wherein said antifungal agent is amphotericin B, nystatin, griseofulvin, miconazole, ketoconazole, tioconazole, econazole or clotrimazole.

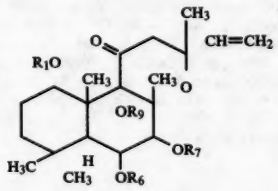
4,883,793

HYDRAZINOCARBONYLOXYLABDANES FOR TREATING CARDIAC FAILURE

Raymond W. Kosley, Jr., Bridgewater, N.J., and Gerard J. O'Malley, Newton, Pa., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed May 9, 1988, Ser. No. 191,457
Int. Cl.[4] A61K *31/54;* C07D *405/12*
U.S. Cl. 514—228.2 22 Claims

1. A compound of the formula



wherein:

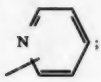
(a) R_1 and R_9 are hydrogen;

(b) R_1 and R_9 taken together form a group of the formula CO, a group of the formula SO or a group of the formula $CHNR_2R_3$ wherein R_2 and R_3 are loweralkyl;

(c) R_6 and R_7 are independently hydrogen, a group of the formula COR_{22} wherein R_{22} is hydrogen or loweralkyl, or a group of the formula $CONR_4Z$ wherein R_4 is hydrogen or loweralkyl and Z is a group of the formula NR_5R_8 or a group of the formula $N{=}CR_{10}R_{11}$ wherein R_5 and R_8 are independently hydrogen, loweralkyl or a group of the formula COR_{12} wherein R_{12} is loweralkyl or a group of the formula $(CH_2)_nNR_{23}R_{24}$ wherein R_{23} and R_{24} are loweralkyl and n is an integer from 2 to 5; R_5 and R_8 taken together with the nitrogen atom to which they are attached form a group of the formula

wherein X is O, S or a group of the formula CHR_{13} wherein R_{13} is hydrogen, loweralkyl or a group of the formula OR_{14} wherein R_{14} is hydrogen, loweralkyl or a group of the formula COR_{15} wherein R_{15} is loweralkyl and p is 0 or 1; R_{10} is hydrogen, loweralkyl or hydroxyloweralkyl; R_{11} is loweralkyl, loweralkenyl, hydroxyloweralkyl, a group of the formula

or a group of the formula



and R_{10} and R_{11} taken together with the carbon atom to which they are attached form a group of the formula

wherein W is O, S, a group of the formula NR_{19} wherein R_{19} is hydrogen or loweralkyl or a group of the formula CHR_{16} wherein R_{16} is hydrogen, loweralkyl or a group of the formula OR_{17} wherein R_{17} is hydrogen, loweralkyl or a group of the formula COR_{18}, wherein R_{18} is loweralkyl and q is 0 or 1, with the proviso that either R_6 or R_7 is a group of the formula $CONR_4Z$ wherein R_4 and Z are as above; or an optical or geometrical isomer thereof, or a pharmaceutically acceptable salt thereof.

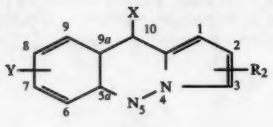
4,883,794

PYRROLO(1,2-B)CINNOLINES

R. Russell L. Hamer, Far Hills; Richard C. Effland, and Joseph T. Klein, both of Bridgewater, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Division of Ser. No. 100,700, Sep. 24, 1987, Pat. No. 4,800,203.
This application Dec. 19, 1988, Ser. No. 286,396
Int. Cl.[4] A61D *31/50;* C07D *487/04*
U.S. Cl. 514—248 1 Claim

1. A method of treating a patient in need of relief from a memory dysfunction characterized by decreased cholinergic function which comprises administering to the patient an effective amount of a compound having the formula



R_1

where R_1 when present is hydrogen, loweralkyl, aryloweralkyl or $—CH_2CO_2C_2H_5$; R_2 is hydrogen, loweralkyl, aryloweralkyl, chlorine, bromine, iodine, formyl, nitro, $—CH=CR_3R_4$ or $—CH_2CHR_3R_4$, R_3 and R_4 being independently hydrogen, loweralkyl, aryl or aryloweralkyl; X is oxygen, amino, loweralkylamino, aryloweralkylamino or methoxy; and Y is hydrogen, fluorine, chlorine, bromine, iodine, trifluoromethyl or nitro, the term aryl in each occurrence signifying a phenyl group having 0, 1, 2 or 3 substituents each of which being independently loweralkyl, loweralkoxy, halogen, CF_3, NO_2 or CN; or a pharmaceutically acceptable acid addition salt thereof.

4,883,795

PIPERAZINYL-HETEROCYCLIC COMPOUNDS

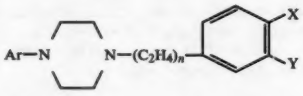
John A. Lowe, III, Stonington, and Arthur A. Nagel, Gales Ferry, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 146,886, Jan. 22, 1988, Pat. No. 4,831,031. This application Jan. 23, 1989, Ser. No. 300,995

Int. Cl.[4] A61K *31/495;* **C07D** *263/58, 235/26, 413/12*

U.S. Cl. 514—253 **16 Claims**

1. A compound of the formula



or a pharmaceutically acceptable acid addition salt thereof, wherein

Ar is naphthyl optionally substituted by fluoro, chloro, trifluoromethyl, methoxy, cyano or nitro; quinolyl; 6-hydroxy-8-quinolyl; isoquinolyl; quinazolyl; benzothiazolyl; benzothiadiazolyl; benzotriazolyl; benzoxazolyl;, benzoxazolonyl; indolyl; indanyl optionally substituted by one or two fluoro; 3-indazolyl optionally substituted by 1-trifluoromethylphenyl; or phthalazinyl;

n is 1 or 2; and

X and Y together with the phenyl to which they are attached form quinolyl; 2-hydroxyquinolyl; benzothiazolyl; 2-aminobenzothiazolyl; benzoisothiazolyl; indazolyl; 2-hydroxyindazolyl; indolyl; spiro; oxindolyl optionally substituted by one to three of $(C_1–C_3)$alkyl, or one of chloro, fluoro or phenyl, said phenyl optionally substituted by one chloro or fluoro; benzoxazolyl; 2-aminobenzoxazoiyl; benzoxazolonyl; 2-aminobenzoxazolinyl; benzothiazolonyl; benzoimidazolonyl; or benzotriazolyl.

4,883,796

OXIME ETHERS OF 2,6-DIOXABICYCLO(3.3.0)OCTANONES, AND COMPOSITIONS AND METHODS FOR TREATMENT OF A CARDIAC DISEASE OR CIRCULATORY WITH THEM

Matyas Leitold, Biberach, and Peter Stoss, Illertissen, both of Fed. Rep. of Germany, assignors to Heinrich Mack Nachf., Illertissen, Fed. Rep. of Germany

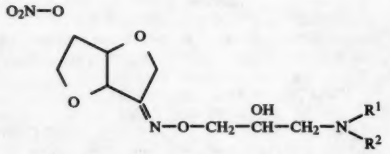
Filed Feb. 2, 1988, Ser. No. 151,336

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1987, 3704604

Int. Cl.[4] A61K *31/34, 31/50, 31/52;* **C07D** *493/04*

U.S. Cl. 514—253 **8 Claims**

1. Oxime ethers of 2,6-dioxabicyclo[3.3.0]octanones of the formula I,



I

in which

R^1 and R^2 are the same or different and are selected from

(a) hydrogen,

(b) a straight-chain or branched alkyl group with 1–6 C-atoms,

(c) an ω-theophyllin-7-yl-C_2–C_3-alkyl agroup,

(d) an unsubstituted or substituted 2,3-dihydrobenzo[1,4-]dioxin-2-yl methyl group,

(e) a benzyl group, or

2 (f) R^1 and R^2, when taken together with the nitrogen atom to which they are attached, are piperazine, optionally substituted by alkyl, phenyl or methoxyphenyl; theophyllin-7-yl; or theobromin-1-yl; and the salts of inorganic or organic acids.

4,883,797

DERIVATIVES OF PIPERAZINE, METHOD FOR MAKING THE SAME

Rafael Foguet; Jose A. Ortiz; Santiago Gubert; Manuel M. Raga, and Aurelio Sacristan, all of Barcelona, Spain, assignors to Ferrer Internacional, S.A., Barcelona, Spain

Continuation of Ser. No. 786,169, Oct. 9, 1985, abandoned, which is a continuation of Ser. No. 504,846, Jun. 17, 1983, abandoned. This application Jan. 7, 1988, Ser. No. 143,214

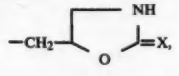
Claims priority, application Spain, Jun. 17, 1982, 514.340

Int. Cl.[4] A61K *31/495;* **C07D** *405/06*

U.S. Cl. 514—255 **9 Claims**

1. A compound having the formula

wherein R_1 is benzhydryl or cinnamyl, and R_2 is selected from the group consisting of $—CH_2—CR_3=CHR_4$,



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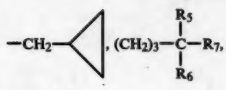


—CH_2NHR_9, —CH_2NH_2, and —COR_{10},
wherein R_3 is hydrogen or chloromethyl,
R_4 is hydrogen, chloromethyl or carbethoxy,
R_5 and R_6 taken together are oxygen or the sequence —O—$(CH_2)_2$—O—,
R_7 is methyl, phenyl or 2-thienyl,
R_9 is 4-sulfamoylbenzoyl
R_{10} is 4-sulfamoylphenyl and
X is oxygen or NH.

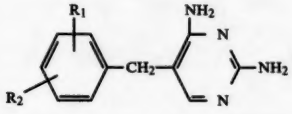
4,883,798

PHARMACEUTICAL COMPOSITIONS

Lujza Petöcz; István Simonyi; Iván Beck; Gábor Gigler; Márton Fekete; Enikö Szirt née Kiszelly; Attila Mándi; Frigyes Görgényi; András Dietz; Elemér Jákfalvi; Katalin Zukovics née Sümeg; Klára Gadó, and Mária Hegedüs, all of Budapest, Hungary, assignors to EGIS Gyogyszergyar, Budapest, Hungary

Filed Jul. 20, 1988, Ser. No. 221,529
Claims priority, application Hungary, Jul. 22, 1987, 3375/87
Int. Cl.[4] A61K *31/505*
U.S. Cl. 514—256 **9 Claims**

1. A method of treating an individual in need of an analgesic, anti-inflammatory agent, anti-anginal agent and/or antioxidant which comprises administering by oral, rectal or parental means, to an individual in need thereof, an effective amount of at least one 2,4-diamino-5-(substituted benzyl)pyrimidine of the formula



wherein
R^1 and R^2 may be the same or different and each stands for hydrogen, hydroxy, C_{1-6} alkoxy, C_{1-6} alkoxy-C_{1-6} alkoxy, C_{2-6} alkenyloxy or phenyl-(C_{1-3} alkoxy), or R^1 and R^2 together form C_{1-2} alkylenedioxy; with the proviso that at least one of R^1 and R^2 is other than hydrogen and with the further proviso that R^1 and R^2 cannot represent 3,4-dimethoxy substitution,
or a pharmaceutically acceptable acid addition salt thereof.

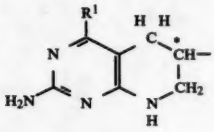
4,883,799

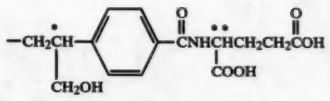
N-(4-(1-HYDROXY-3-(5,6,7,8-TETRAHYDROPYRIDO(2,3-D)-PYRIMIDIN-6-YL)PROP-2-YL)BENZOYL)GLUTAMIC ACID DERIVATIVES

Edward C. Taylor, and Cheol-min Yoon, both of Princeton, N.J., assignors to The Trustees of Princeton University, Princeton, N.J.

Filed Jun. 29, 1988, Ser. No. 213,275
Int. Cl.[4] A61K *31/505;* **C07D** *425/08*
U.S. Cl. 514—258 **6 Claims**

1. A compound selected from the group consisting of a glutamic acid derivative having the formula:





in which
the configuration about the carbon atoms designated C* is (R) or (S), and the configuration about the carbon atom designated C** is (S); and
the pharmaceutically acceptable salts thereof.

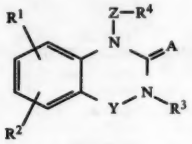
4,883,800

QUINAZOLINE DERIVATIVES AND PROCESS FOR THEIR PRODUCTION

Masashi Hashimoto; Teruo Oku; Yoshikuni Ito; Takayuki Namiki; Kozo Sawada; Chiyoshi Kasahara, and Yukihisa Baba, all of Ibaraki, Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 908,005, Sep. 17, 1986, Pat. No. 4,734,419.
This application Dec. 8, 1987, Ser. No. 130,297
Claims priority, application United Kingdom, Oct. 7, 1985, 8524663
Int. Cl.[4] A61K *31/505;* **C07D** *239/80*
U.S. Cl. 514—259 **7 Claims**

1. A compound of the formula:



in which
R^1 and R^2 are each hydrogen, halogen, lower alkoxy or halo(lower)alkyl,
R^3 is phenyl(lower)alkyl which may have one or more substituent(s) selected from the group consisting of halogen, lower alkoxy, halo(lower)alkyl and lower alkyl,
R^4 is carboxy or protected carboxy,
A is sulfur atom,
Y is carbonyl, thiocarbonyl or sulfonyl and
Z is lower alkylene, and pharmaceutically acceptable salts thereof.

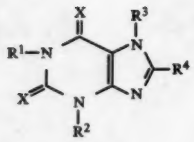
4,883,801

XANTHINE DERIVATIVE PEST CONTROL AGENTS

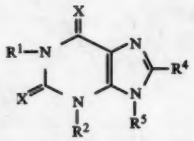
James A. Nathanson, Wellesley, Mass., assignor to The General Hospital Corporation, Boston, Mass.

Continuation-in-part of Ser. No. 648,086, Sep. 7, 1984, abandoned. This application Aug. 18, 1986, Ser. No. 898,748
Int. Cl.[4] A01N *43/90*
U.S. Cl. 514—263 **18 Claims**

1. A method of controlling a phosphodiesterase-containing invertebrate pest which comprises bringing into contact with said pest a pest-controlling amount of a xanthine derivative having the general formula:



or



or the acid addition salts thereof, wherein

X is oxygen or sulfur; and

R^1, R^2, R^3, R^4 and R^5 are selected from hydrogen; aliphatic hydrocarbons having 1–8 carbon atoms and cycloaliphatic hydrocarbons having 3–8 carbon atoms; aliphatic hydrocarbons having 1–8 carbon atoms and cycloaliphatic hydrocarbons having 3–8 carbon atoms substituted with 1–3 halogen atoms, C_1–C_4 alkyl, or hydroxy; alkoxy having 1–6 carbon atoms; phenyl; naphthyl; halo, hydroxy, or C_1–C_4 alkyl-substituted phenyl or naphthyl; or phenoxy;

with the proviso that for compound I, at least one of R^1, R^2,R^3 and R^4 is other than hydrogen, methyl and ethyl, and

with the further proviso that said compound has a V_{max} of more than 50 and an EC_{50} of no more than 3, where V_{max} is expressed as the percent inhibition of feeding at a 3% (gm/100 ml) concentration of spray and EC_{50} is defined as the spray concentration (gm/100 ml) required to cause a 50% inhibition of feeding.

4,883,802

4-PIPERIDINECARBOXAMIDE DERIVATIVES

Kunihiro Ninomiya; Ken-Ichi Saito, both of Machida; Shuji Morita; Akihiro Tobe, both of Yokohama, and Issei Nitta, Machida, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

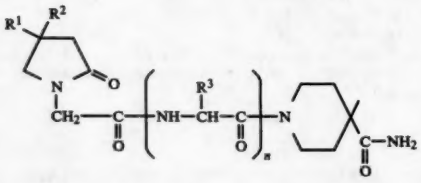
Filed Sep. 9, 1988, Ser. No. 243,322

Claims priority, application Japan, Sep. 16, 1987, 62/231591

Int. Cl.[4] A61K *31/395;* **C07D** *401/12, 401/14*

U.S. Cl. 514—278 **3 Claims**

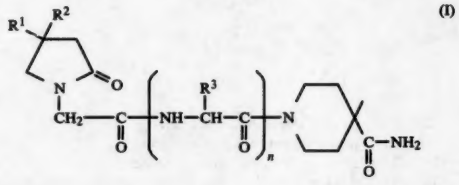
1. 4-Piperidinecarboxamide derivatives represented by the general formula (I):



(I)

wherein each R^1 and R^2 represents a hydrogen atom, or R^1 together with R^2 represents a cyclopentanespiro or cyclohexanespiro group; R^3 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an aralkyl group or an indolylalkyl group; and n is an integer of 1 or 2.

3. A pharmaceutical composition useful as the agent for improving the impaired brain function comprising as the effective ingredient at least one of 4-piperidinecarboxamide derivatives represented by the general formula (I):



(I)

wherein each R^1 and R^2 represents a hydrogen atom, or R^1 together with R^2 represents a cyclopentanespiro or cyclohexanespiro group; R^3 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an aralkyl group or an indolylalkyl group; and n is an integer of 1 or 2.

4,883,803

TREATMENT OF ANXIETY

Michael B. Tyers, Welwyn, England, assignor to Glaxo Group Limited, London, England

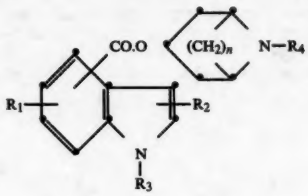
Continuation of Ser. No. 888,467, Jul. 23, 1986, abandoned. This application Oct. 19, 1988, Ser. No. 259,719

Claims priority, application United Kingdom, Jul. 24, 1985, 8518658

Int. Cl.[4] A61K *31/44*

U.S. Cl. 514—304 **3 Claims**

1. A method for the treatment of anxiety in a human or animal subject suffering from or susceptible to anxiety which comprises administering to the human or animal subject an effective amount for the treatment of anxiety in said subject of a compound of formula (II)



(II)

wherein

R_1 and R_2 independently represent hydrogen, halogen, C_{1-4}alkoxy, hydroxy, amino, C_{1-4}alkylamino, di(C_{1-4})alkylamino, mercapto or C_{1-4}alkylthio;

R_3 represents hydrogen, C_{1-4}alkyl, C_{3-5}alkenyl, aryl or aralkyl;

R_4 represents hydrogen, C_{1-7}alkyl, C_{3-5}alkenyl or aralkyl; n is 2 or 3;

the free valence is attached to either fused ring and the azabicyclic ring is in either the exo or endo configuration; or an acid addition salt or quaternary ammonium salt thereof.

4,883,804

AROMATIC COMPOUNDS

Francis Ince, Loughborough; Brian Springthorpe, Shepshed, and John Dixon, Melton Mowbray, all of England, assignors to Fisons plc, Ipswich, England

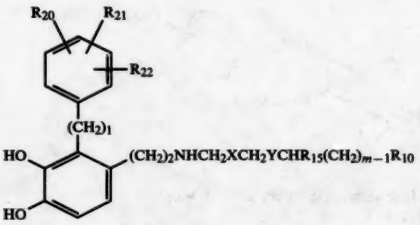
Filed Nov. 19, 1986, Ser. No. 932,473

Claims priority, application United Kingdom, Nov. 20, 1985, 85/28605; Jul. 10, 1986, 86/16792; Jul. 10, 1986, 86/16793; Jul. 10, 1986, 86/16794

Int. Cl.[4] C07C *87/28;* **C07D** *239/02;* **A01N** *37/30;* **A61K** *31/205*

U.S. Cl. 514—357 **10 Claims**

1. A compound of formula I,



I

in which X represents a C2 to 8 alkylene chain optionally interrupted by a double bond or by $S(O)_n$, wherein n is 0, 1 or 2;

Y represents O or NH,

l and m each independently represent 2, 3 or 4,

R_{10} represents phenyl substituted by one or more substituents R_{23}, which may be the same or different; or R_{10} represents pyridyl, a saturated carbocyclic group, alkyl C 1 to 6 or hydrogen,

R_{15} represents hydrogen or together with R_{23} forms a $(CH_2)_p$ chain, wherein p represents 0, 1 or 2;

R_{20}, R_{21}, R_{22} and R_{23}, which may be the same or different, independently represent hydrogen, alkyl C 1 to 6, NHR_{25}, SH, NO_2, halogen, CF_3, SO_2R_{30}, CH_2OH or OH, wherein R_{25} *represents hydrogen, alkyl C* 1 to 6, alkanoyl C 1 to 6 or SO_2 alkyl C 1 to 6, and R_{30} represents alkyl C 1 to 6 or NH_2,

provided that thwn X represents an uninterrupted C4 alkylene chain, Y represents NH, m represents 2, l represents 2, R_{10} represents phenyl, R_{15} represents hydrogen, and R_{21}, R_{22} and R_{23} represent hydrogen, then R_{20} does not represent hydrogen or 4-OH,

and pharmaceutically acceptable salts and solvates thereof.

10. A method of treatment of renal failure which comprises administration of an effective amount of a compound according to claim **1** to a patient suffering from such a condition.

4,883,805

STABLE, INJECTABLE SOLUTIONS OF VINCA DIMER SALTS

Rodney Kasan, Raanana; Haim Yellin, Ramat-Gan, and Michael Seiffe, Raanana, all of Israel, assignors to Teva Pharmaceutical Industries Ltd., Israel

Filed Jul. 28, 1987, Ser. No. 78,805

Claims priority, application Israel, Jul. 6, 1987, 83086

Int. Cl.[4] A61K *31/435*

U.S. Cl. 514—411 **15 Claims**

1. A stable, injectable pharmaceutical composition comprising an aqueous solution comprising per 1 ml of solution:

from about 0.2 to about 2 mg of one or more pharmaceutically acceptable vinca dimer salts;

from about 0.1 to about 1.0 mg of a pharmaceutically acceptable ethylenediamine-tetraacetic acid (EDTA) salt;

acetate buffer in an amount necessary to maintain said aqueous solution at a pH of from about 3.0 to about 5.5; and

from about 1.5 to about 2.5 mg of a preservative selected from methyl paraben, propyl paraben and mixtures thereof.

4,883,806

CERTAIN CYCLOPROPANEDICARBOXYLATES WITH AN UNSATURATED SIDE CHAIN HAVING INSECTICIDAL ACTIVITY

Jacques Martel, Bondy; Jean Tessier, Vincennes, and Andre Teche, Paris, all of France, assignors to Roussel Uclaf, Paris, France

Division of Ser. No. 756,396, Jul. 17, 1985, Pat. No. 4,732,903, which is a division of Ser. No. 550,081, Nov. 8, 1983, Pat. No. 4,542,142, which is a continuation-in-part of Ser. No. 279,076, Jun. 30, 1981, abandoned. This application Sep. 23, 1987, Ser. No. 100,284

Claims priority, application France, Jul. 2, 1980, 83 01344; Nov. 22, 1982, 80 14722; Jan. 28, 1983, 82 19515

Int. Cl.[4] C07D *209/52;* **A61K** *31/40*

U.S. Cl. 514—417 **3 Claims**

1. A compound selected from the group consisting of (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)-methyl (1R,cis, ΔZ) 2,2-dimethyl-3-[3-oxo-3-(2,2,2-trifluoroethoxy)-1-propenyl]-cyclopropane carboxylate, (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)-methyl (1R, cis, ΔZ) 2,2-dimethyl-3-[3-oxo-3-(2,2,2-trifluoro-1-(trifluoromethyl)-ethoxy-1-propenyl] cyclopropane carboxylate, (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)-methyl (1R, cis, ΔZ) 2,2-dimethyl-3-[3-oxo-3-cyclopropylmethoxy-1-propenyl]-cyclopropane carboxylate, (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)-methyl (1R, cis, ΔZ) 2,2-dimethyl-3-[3-oxo-3-propoxy-1-propenyl]-cyclopropane carboxylate, (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)-methyl (1R, cis, ΔZ) 2,2-dimethyl-3-[3-oxo-3-(1-methylethoxy)-1-propenyl]-cyclopropane carboxylate and (1,3,4,5,6,7-hexahydro-1,3-dioxo-2H-isoindol-2-yl)-methyl (1R, cis, ΔZ) 2,2-dimethyl-3-[3-oxo-3-methoxy-1-propenyl]-cyclopropane carboxylate.

3. A method of combatting an infection caused by acariens in warm-blooded animals comprising contacting warm-blooded animals with an anti-acaricidally effective amount of a compound of claim **1**.

4,883,807

1,2,5,6-TETRAHYDROPYRIDYL TRIAZOLES AND TETRAZOLES USEFUL AS FUNGICIDES

John M. Clough, Marlow; Christopher R. A. Godfrey, Bracknell; Paul J. de Fraine, Wokingham, and Brian K. Snell, Reading, all of England, assignors to Imperial Chemical Industries PLC, London, United Kingdom

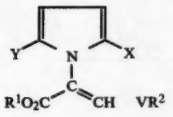
Filed Dec. 1, 1987, Ser. No. 127,769

Claims priority, application United Kingdom, Dec. 16, 1986, 8630027; Mar. 24, 1987, 8706950

Int. Cl.[4] A61K *31/40;* **C07D** *207/50, 207/337*

U.S. Cl. 514—427 **4 Claims**

1. A compound of formula (I):



(I)

and stereoisomers and salts thereof, wherein R^1 and R^2, which are the same or different, are C_{1-6} alkyl; V is oxygen or sulphur; Y is hydrogen, C_{1-6} alkyl, cyano, nitro or halogen; X is

Z is NOR^5 or

A is CO_2R^6, COR^7, cyano, nitro or acylamino; B is hydrogen, C_{1-6} alkyl, phenyl, CO_2R^8, COR^9, cyano, nitro or acylamino; R^4 is CO_2R^3 or R^{17}; R^3 is C_{1-6} alkyl; R^5 to R^9 and R^{17}, which are the same or different, are hydrogen, C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-8} cycloalkyl-(C_{1-6})alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, phenyl or phenyl(C_{1-6})alkyl; any alkyl, cycloalkyl or cycloalkylalkyl moiety being unsubstituted or substituted with hydroxy, halogen, C_{1-4} alkoxy or C_{1-4} alkoxycarbonyl, any alkynyl or alkenyl moeity being unsubstituted or substituted with phenyl, and any phenyl being unsubstituted or substituted with halogen, hydroxy, C_{1-6} alkyl, methoxy, trifluoromethyl or trifluoromethoxy.

4,883,808

CONDENSATION PRODUCTS OF CYCLIC DIKETONES AND ASCORBIC ACID AS IMMUNOMODULATORY AGENTS

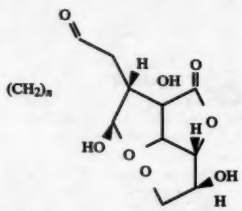
Gabor B. Fodor; Kawporn Sussangkarn, both of Morgantown, W. Va., and Robert W. Veltri, Gaithersburg, Md., assignors to American Biotechnology Company, Rockville, Md.

Continuation of Ser. No. 90,214, Aug. 27, 1987, abandoned. This application Jul. 20, 1988, Ser. No. 222,350

Int. Cl.[4] A61K *31/365*; C07D *493/14*

U.S. Cl. 514—468 **28 Claims**

1. A compound of the formula:



wherein n is 1, 2 or 3.

11. A method of stimulating the immune response of a mammal in need of such stimulation which comprises administering an amount which is effective to stimulate such response of <3,4'>-hemiketal-<3,6>-ketal of 2-(1',4'-diketo-3'-cyclohexyl)-2-hydroxy-3-keto-4-dihydroxyethylbutyrolactone.

4,883,809

7-OXABICYCLOHEPTANE IMINO INTERPHENYLENEOXY SUBSTITUTED PROSTAGLANDIN ANALOGS USEFUL IN THE TREATMENT OF THROMBOTIC AND VASOSPASTIC DISEASE

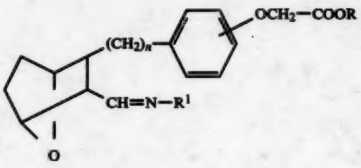
Raj N. Misra, 12 Eaton Pl., Hopewell, N.J. 08525

Filed Nov. 17, 1988, Ser. No. 272,378

Int. Cl.[4] A61K *31/34*; C07D *307/00*

U.S. Cl. 514—469 **20 Claims**

1. A compound having the formula

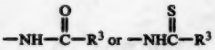


including all stereoisomers thereof, wherein

n is 1 or 2;

R is H, alkali metal or lower alkyl; and

R^1 is —OR^2,



wherein

R^2 is lower alkyl, aryl, aralkyl, alkanoyl or aroyl; and

R^3 is lower alkyl, aryl, aralkyl, alkoxy, aryloxy, aralkoxy, alkylamino, arylamino, or aralkylamino;

wherein lower alkyl or alkyl by itself or as part of another group may be unsubstituted or substituted with halo, aryl, alkyl-aryl, haloaryl, cycloalkyl or alkylcycloalkyl;

aryl by itself or as part of another group may be unsubstituted or substituted with 1 or 2 lower alkyl groups, 1 or 2 halogens and/or 1 or 2 lower alkoxy groups; and cycloalkyl by itself or as part of another group may be unsubstituted or substituted with 1 or 2 halogens, 1 or 2 lower alkyl groups and/or 1 or 2 lower alkoxy groups.

4,883,810

ETHERS

Salvador Moncada, West Wickham, England, assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 712,788, Mar. 18, 1985, which is a continuation of Ser. No. 795,524, May 10, 1977, Pat. No. 4,539,333. This application Aug. 29, 1988, Ser. No. 237,984

Claims priority, application United Kingdom, Aug. 17, 1976, 34151; Sep. 3, 1976, 36547

The portion of the term of this patent subsequent to Sep. 3, 2002, has been disclaimed.

Int. Cl.[4] A61K *31/557, 31/34*

U.S. Cl. 514—469 **6 Claims**

1. A method of treating a body portion for transplant which comprises contacting said body portion with prostacyclin.

4,883,811

7-OXABICYCLOHEPTANE IMINO INTERPHENYLENE SUBSTITUTED PROSTAGLANDIN ANALOGS USEFUL IN THE TREATMENT OF THROMBOTIC DISEASE

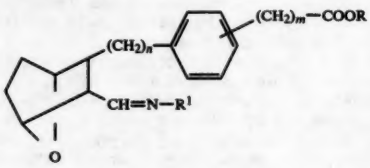
Raj N. Misra, 12 Eaton Pl., Hopewell, N.J. 08525, and Steven E. Hall, 57 Colleen Cir., Trenton, N.J. 08638

Filed Nov. 17, 1988, Ser. No. 272,373

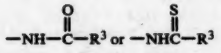
Int. Cl.[4] A61K *31/34*; C07D *307/00*

U.S. Cl. 514—469 **20 Claims**

1. A compound having the formula



including all stereoisomers thereof, wherein
n is 1 or 2; m is 1 or 2;
R is H, alkali metal or lower alkyl; and
R^1 is —OR^2,



wherein
R^2 is lower alkyl, aryl, aralkyl, cycloalkylalkyl, alkanoyl or aroyl and
R^3 is lower alkyl, aryl, aralkyl, alkoxy, aryloxy, aralkoxy, alkylamino, arylamino, cycloalkylalkylamino or aralkylamino;
wherein lower alkyl or alkyl by itself or as part of another group may be unsubstituted or substituted with halo, alkoxy, aryl, alkyl-aryl, haloaryl, cycloalkyl or alkylcycloalkyl;
aryl by itself or as part of another group may be unsubstituted or substituted with 1 or 2 lower alkyl groups, 1 or 2 halogens and/or 1 or 2 lower alkoxy groups;
cycloalkyl by itself or as part of another group may be unsubstituted or substituted with 1 or 2 halogens, 1 or 2 lower alkyl groups and/or 1 or 2 lower alkoxy groups.

4,883,812
TREATMENT OF HYPERTENSION USING PROSTACYCLIN

Salvador Moncada, West Wickham, England, assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 712,788, Mar. 18, 1985, which is a continuation of Ser. No. 795,524, May 10, 1977, Pat. No. 4,539,333. This application Aug. 29, 1988, Ser. No. 237,987
Claims priority, application United Kingdom, Aug. 17, 1976, 34151; Sep. 3, 1976, 36547
The portion of the term of this patent subsequent to Sep. 3, 2002, has been disclaimed.
Int. Cl.[4] A61K *31/557, 31/34*
U.S. Cl. 514—469 **4 Claims**

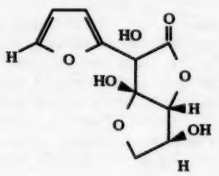
1. A method of treating a mammal for hypertension which comprises parenterly administering an effective anti-hypertensive amount of prostacyclin to said mammal.

4,883,813
METHOD OF TREATING INFLAMMATION IN MAMMALS UTILIZING KETOBUTYROLACTONES AND FURYLBUTYROLACTONES

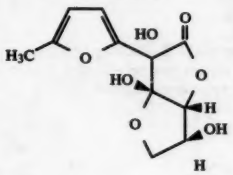
Peter E. Maxim, Germantown, and Robert W. Veltri, Gaithersburg, both of Md., assignors to American Biotechnology Company, Rockville, Md.

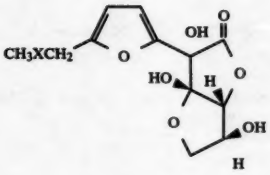
Filed Aug. 24, 1988, Ser. No. 236,003
Int. Cl.[4] A61K *31/34*
U.S. Cl. 514—470 **11 Claims**

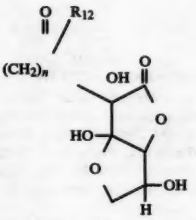
1. A method of treating inflammation in a mammal in need of such treatment which comprises administration to said mammal of an antiinflammatory amount of a compound selected from the group represented by the formulas:



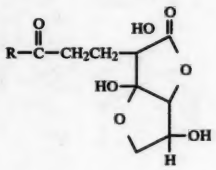
-continued







and



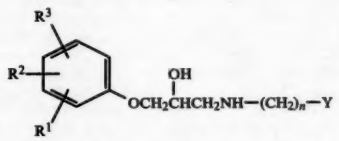
wherein x is sulfur or oxygen; R is lower alkyl; n is 2, 3, or 4; R_{12} is hydrogen, lower alkyl, or lower haloalkyl.

4,883,814
1-ARYLOXY-3-(SUBSTITUTED ALKYLAMINO)-2-PROPANOLS AND USE AS β-BLOCKER

John J. Baldwin, Gwynedd Valley, and Gerald S. Ponticello, Lansdale, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 54,094, May 18, 1987, Pat. No. 4,766,541. This application Jul. 7, 1988, Ser. No. 216,058
Int. Cl.[4] A61K *31/275;* **C07C** *43/02*
U.S. Cl. 514—524 **6 Claims**

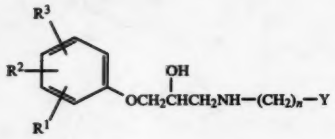
1. A compound of structural formula



or a pharmaceutically acceptable salt thereof, wherein:
Y is a di(C_{1-3}alkyl)amino

R^1 is hydrogen;
R^2 is hydrogen;
R^3 is cyano; and
n is 2, 3 or 4.

3. A pharmaceutical β-blocking composition comprising a pharmaceutical carrier and an effective β-blocking amount of a compound of structural formula:



or a pharmaceutically acceptable salt thereof, wherein:
Y is a di(C_{1-3}alkyl)amino
R^1 is hydrogen;
R^2 is hydrogen;
R^3 is cyano; and
n is 2, 3 or 4.

4,883,815

HYDROCINNAMIC ACID DERIVATIVES

Werner Aschwenden, Ettingen; René Imhof, Gipf-Oberfrick, both of Switzerland; Roland Jakob-Roetne, Inzlingen, Fed. Rep. of Germany, and Emilio Kyburz, Reinach, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

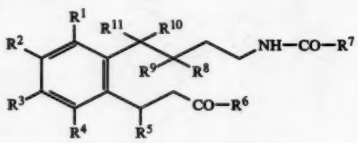
Filed Jul. 5, 1988, Ser. No. 215,003

Claims priority, application Switzerland, Jul. 21, 1987, 2764/87

Int. Cl.[4] A61K *31/24;* **C07C** *103/84*

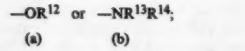
U.S. Cl. 514—541 **32 Claims**

1. A compound of the formula



I

wherein
one or two of the symbols R^1 to R^4 are halogen or methoxy and the others are hydrogen;
R^5 is hydrogen or phenyl;
R^6 is a residue of the formula



(a) (b)

R^7 is (C_1–C_4)-alkyl, (C_2–C_5)-alkanoylamino-(C_2–C_5)-alkyl, amino or (C_1–C_4)-alkoxyphenyl;
R^8 and R^9 each, independently, are hydrogen or (C_1–C_4)-alkyl;
R^{10} is hydrogen and R_{11} is hydroxy or R^{10} and R^{11} taken together are oxo;
R^{12} is hydrogen, (C_1–C_{10})-alkyl, pyridylmethyl or carbamoylmethyl;
R^{13} is hydrogen, (C_1–C_4)-alkyl and R^{14} is hydrogen, (C_1–C_4)-alkyl, pyridyl, phenyl-(C_1–C_4)-alkyl, carboxy-(C_1–C_4)-alkyl, carbamoyl-(C_1–C_4)-alkyl, (C_1–$C_{alkoxycarbonyl}$-(C_1–C_4)-alkyl, di-(C_1–C_4)-alkoxycarbonyl-(C_2–C_5C_5)-alkyl, piperidino-(C_2–C_4)-alkyl or halopyridinecarboxamido-(C_2–C_4)-alkyl or R^{13} and R^{14} taken together with the nitrogen atom are 4-(C_1–C_4)-alkyl-piperazin-1-yl,
or a pharmaceutically acceptable salt of a basic compound of formula I with an acid or of an acidic compound of formula I with a base.

4,883,816

ANTIHYPERTENSIVE DERIVATIVES

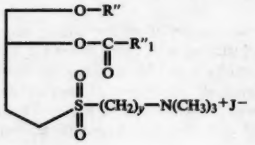
Allan Wissner, Ardsley; Phaik E. Sum, New City, both of N.Y., and Robert E. Schaub, Upper Saddle River, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 679,788, Dec. 10, 1984, Pat. No. 4,762,942. This application Feb. 16, 1988, Ser. No. 157,055

Int. Cl.[4] A61K *31/10;* **C07C** *147/00*

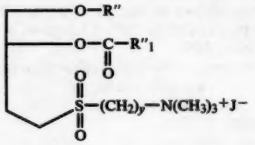
U.S. Cl. 514—546 **6 Claims**

1. A method of treating hypertension in a warm-blooded animal comprising administering to said animal an effective amount of a compound represented by the formula:



wherein
R″ is a C_2–C_{20} alkyl group,
R''_1 is a C_1 to C_4 alkyl group,
y is an integer from 2 to 10, and
J is a pharmacologically acceptable anion.

5. A compound of the formula:



wherein
R″ is a C_2–C_{20} alkyl group,
R''_1 is a C_1 to C_4 alkyl group,
y is an integer from 2 to 10, and
J is a pharmacologically acceptable anion.

4,883,817

RAISING CHICKENS FOR MEAT PRODUCTION WITH KETOISOCAPROATE-CONTAINING FEEDS

Steven L. Nissen, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Mar. 2, 1987, Ser. No. 20,606

The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.

Int. Cl.[4] A61K *31/19*

U.S. Cl. 514—557 **10 Claims**

1. The method of feeding chickens being raised for meat production to promote the growth of the chickens and to reduce the cholesterol content of the meat, comprising orally administering to said chickens an effective amount of alpha-ketoisocaproate (KIC) as a supplement to their feed diet during a substantial part of their growth period from 0 to 6 weeks of age, said diet containing sufficient leucine-containing protein for the normal requirements of said growing chickens, the amount of KIC administered corresponding to at least 0.05 weight percent (wt. %) of sodium KIC based on the dry weight of the total diet.

4,883,818

ONSET-HASTENED/ENHANCED ANALGESIA

Abraham Sunshine, New York, and Eugene M. Laska, Larchmont, both of N.Y., assignors to Analgesic Associates, Larchmont, N.Y.

Filed Nov. 17, 1987, Ser. No. 121,848
Int. Cl.[4] A61K *31/19*
U.S. Cl. 514—570 41 Claims

1. The method of eliciting an onset-hastened and enhanced analgesic response in a human mammal suffering from pain and in need of such treatment, comprising administering to such organism a unit dosage onset-hastening/enhancing analgesically effective amount of the S(+) fenoprofen enantiomer, and said enantiomer being substantially free of its R(−) fenoprofen antipode.

4,883,819

USE OF A, B AND C PROSTAGLANDINS AND DERIVATIVES THEREOF TO TREAT OCULAR HYPERTENSION AND GLAUCOMA

Laszlo Z. Bito, New York, N.Y., assignor to The Trustees of Columbia University in the City of New York, New York, N.Y.

Continuation-in-part of Ser. No. 892,387, Jul. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 839,056, Mar. 13, 1986, abandoned. This application Mar. 5, 1987, Ser. No. 22,046
Int. Cl.[4] A61K *37/08, 31/215*
U.S. Cl. 514—573 13 Claims

1. A method for treating ocular hypertension or glaucoma in a subject's eye which comprises topically applying to the surface of the eye with an effective intraocular pressure reducing amount of prostaglandin A (PGA), prostaglandin B (PGB), or prostaglandin C (PGC), applied as the free acid form or as an ester so as to reduce the intraocular pressure of the eye and maintain such reduced intraocular pressure.

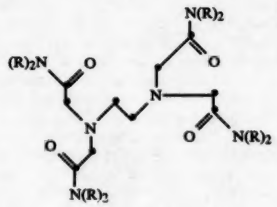
4,883,820

METHODS FOR IMPROVING FEED UTILIZATION AND LACTATION IN RUMINANT ANIMALS

Alan W. White, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 81,063, Aug. 3, 1987, Pat. No. 4,801,618. This application Oct. 25, 1988, Ser. No. 262,374
Int. Cl.[4] C07C *103/50*
U.S. Cl. 514—616 6 Claims

1. A method for improving lactation in lactating ruminant animals comprising administering to said animals a lactation improving amount of a compound of the formula:



wherein each R, independently, represents a straight or branched chain alkyl of one to six carbon atoms, or the physiologically acceptable salts thereof.

4,883,821

AGENT FOR TREATING HYPERURICEMIA

Kouji Nakamoto, Saitama; Nobumichi Morishita, Tokyo, and Masahide Aoyama, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 332,011
Claims priority, application Japan, Apr. 13, 1988, 63-90890
Int. Cl.[4] A61K *31/165*
U.S. Cl. 514—617 1 Claim

1. A method for treating hyperuricemia, which comprises administering to a patient in need thereof, a pharmacologically effective amount of N-(3-(4'-(2'',6''-dimethylheptyl)phenyl)-butanoyl)ethanolamine.

4,883,822

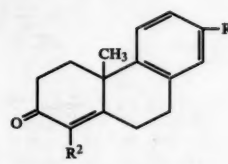
AGENT FOR REGULATING THE MOTIONAL FUNCTION OF GASTROINTESTINAL TRACT

Kohtaro Matsuo, Minoo; Youichirou Ezaki, Neyagawa; Akihiro Tobe, Yokohama; Satoshi Yamazaki; Kozue Enda, both of Machida, and Mariko Kitsukawa, Fujisawa, all of Japan, assignors to Arakawa Chemical Industries, Ltd., Osaka and Mistubishi Kasei Corporation, Tokyo, both of, Japan

Filed Sep. 23, 1988, Ser. No. 248,087
Claims priority, application Japan, Sep. 25, 1987, 62-240247
Int. Cl.[4] A61K *31/12*
U.S. Cl. 514—680 6 Claims

1. A composition for regulating the motional function of the gastrointestinal tract, comprising a therapeutically effective amount of a 4a-metyl-4,4a,9,10-tetrahydro-2(3H)-phenanthrenone derivative represented by the following formula I;

(I)



wherein R^1 represents a hydrogen atom, an alkyl group or an alkoxy group and R^2 represents a hydrogen atom or an alkyl group.

4,883,823

SELF-CONTAINED RENEWABLE ENERGY SYSTEM

John H. Perry, Jr., Jupiter, Fla.; Bharat K. Bhatt, Fullerton, Calif.; Jesse Capps, Santa Ana, Calif.; Paul M. Eldridge, Jupiter, Fla.; Leonard Greiner, Sorda Ana, Calif.; Robert W. Lockyer, Jupiter, Fla.; Michelle Martin, Atlanta, Ga.; Raymond R. McNeice, Lake Park, Fla.; Steven M. Misiaszek, Lake Park, Fla.; Stanton S. Perry, Dana Point, Calif.; Thomas F. Sullivan, Lake Worth, Fla., and Paul G. Campbell, North Palm Beach, Fla., assignors to Perry Oceanographics, Inc., Riviera Beach, Fla.

Division of Ser. No. 931,464, Nov. 14, 1986, Pat. No. 4,776,171. This application Apr. 21, 1988, Ser. No. 184,474
Int. Cl.[4] C07O *27/06;* C07L *31/04*
U.S. Cl. 518—702 6 Claims

1. In a process for preparing methanol and an active metal oxide, the process comprising calcining an alkaline earth metal carbonate at elevated temperatures to form the alkaline earth metal oxide and carbon dioxide, admixing the carbon dioxide with a flow of hydrogen gas at a molar ratio of H_2:CO_2 of at least about 3:1 and reacting the H_2 and CO_2 at elevated temperatures, to form a gaseous shift reaction mixture comprising hydrogen, carbon dioxide and carbon monoxide and water vapor; condensing out any water from the gaseous shift reaction mixture to form a synthesis gas mixture having an average molecular weight for methanol synthesis; compressing the substantially water-free synthesis gas mixture to a total pres-

sure of at least about 500 psig and pre-heating to a temperature of at least about 200° F.; and passing the pressurized and pre-heated water-free shift reaction mixture over a catalyst to form a product mixture comprising methanol and water; the improvement which comprises continuously monitoring the relative proportions of hydrogen gas to carbon dioxide and carbon monoxide in the synthesis gas mixture by a process comprising continuously collecting and measuring the amount of water condensed from the gaseous shift reaction mixture, to determine the amount of hydrogen which reacted with carbon dioxide to form water and carbon monoxide, and controlling the rate of the flow of hydrogen to be admixed with the carbon dioxide to maintain an average molecular weight for the synthesis gas mixture.

4,883,824

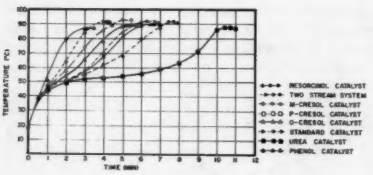
MODIFIED PHENOLIC FOAM CATALYSTS AND METHOD

Paul J. Meunier, Sarnia; James Lunt, Brights Grove, and Edwin J. MacPherson, Sarnia, all of Canada, assignors to Fiberglas Canada, Inc., Ontario, Canada

Continuation of Ser. No. 853,397, Apr. 18, 1986, abandoned. This application Feb. 9, 1989, Ser. No. 310,491

Int. Cl.[4] C08J *9/14*

U.S. Cl. 521—88 **15 Claims**



1. A method of making a closed cell phenolic foam material which comprises providing a mixture of a phenol formaldehyde resole resin from which most of any free water has been stripped and having a P/F ratio of from about 1:1.5 to 1:4.5, a surfactant and a blowing agent,

and mixing said mixture with a modified acid catalyst consisting essentially of an aromatic acid, a compound selected from the group consisting of resorcinol, m-cresol, o-cresol and p-cresol, said compound being present in an amount effective to cause a shorter time to peak exotherm than would result if said compound was omitted from said acid catalyst without causing a significant increase in the peak temperature, and a diluent,

and subsequently curing the resultant mixture to yield a closed cell phenolic foam.

4,883,825

PROCESS FOR THE MANUFACTURE OF LOW DENSITY, FLEXIBLE POLYURETHANE FOAMS

Paul M. Westfall, St. Albans; Frank E. Critchfield, South Charleston, and William A. Gill, Hurricane, all of W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Dec. 30, 1987, Ser. No. 139,757

Int. Cl.[4] C08G *18/14*

U.S. Cl. 521—112 **14 Claims**

1. A process for the manufacture of low density, flexible polyurethane foams which comprises reacting:

(a) a polymer/polyol formed insitu in a polyether polyol having at least 85 percent primary hydroxyl groups, a nominal functionality of at least three, and an ethylene oxide content of from 8 to 30 percent of the polyether polyol;

(b) 0.1 to 5 parts per hundred parts of polyol of a polyhydric material selected from the group consisting of glycerine, trimethylol propane, sorbitol, erythritol, sucrose, simple carbohydrates, and low molecular weight polyethylene oxide polyols which is reactive with isocyanate groups but not more reactive with an isocyanate group than are the primary hydroxyl groups on the polyether polyol (a), said polyhydric material also being sufficiently hydrophillic so as to be at least 40 weight percent soluble in 25° C. water;

(c) water in an amount from 4.0 to 20 parts per hundred parts of polyol;

(d) an organic polyisocyanate; and

(e) 0.001 to 5 percent, based on the weight of (a), b, c and d, of a catalyst for the reaction of (a) and (d) in the presence of a foam stabilizer.

4,883,826

TERTIARY AMINE-CONTAINING POLYOLS PREPARED IN A MANNICH CONDENSATION REACTION USING A MIXTURE OF ALKANOLAMINES

J. E. Marugg, Boerhaavelaan, Netherlands; Michael A. P. Gansow, Waedenswil, Switzerland, and J. A. Thoen, Dommelstraat, Netherlands, assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 27, 1988, Ser. No. 225,313

Int. Cl.[4] C08G *18/28*

U.S. Cl. 521—164 **12 Claims**

1. A polyurethane foam which is the reaction product of a reaction mixture comprising a polyisocyanate, a blowing agent and a polyol characterized in that the polyol is prepared by alkoxylating a Mannich condensate of (a) phenol or an inertly-substituted phenol, (b) formaldehyde, and (c) a mixture of (i) diethanolamine and (ii) at least one other alkanolamine, wherein the weight ratio of diethanolamine to the other alkanolamine is from about 1:19 to about 19:1.

4,883,827

RECURABLE AND CURED CELLULAR MATERIALS

Gregory A. Ferro, Hoffman Estates, Ill., assignor to Imi-Tech Corporation, Elk Grove, Ill.

Filed Sep. 6, 1988, Ser. No. 240,802

Int. Cl.[4] C08J *9/36*

U.S. Cl. 521—184 **8 Claims**

1. A process which comprises exposing cured polyimide foam to an atmosphere of steam at elevated temperature and pressure for a period of time sufficient to convert said foam into a non-flexible, non-resilient recurable cellular material, and subsequently heating to recure such cellular material in the absence of steam.

4,883,828

DISINFECTANT POLYMERIC COATINGS FOR HARD SURFACES

Thomas R. Oakes, Stillwater; Daniel E. Pedersen, Cottage Grove, and Donna M. Majewski, Lino Lakes, all of, assignors to Ecolab Inc., St. Paul, Minn.

Continuation of Ser. No. 48,800, May 12, 1989, abandoned. This application Jan. 30, 1989, Ser. No. 303,009

Int. Cl.[4] C08K *5/19*; A61L *2/13*

U.S. Cl. 523—122 **4 Claims**

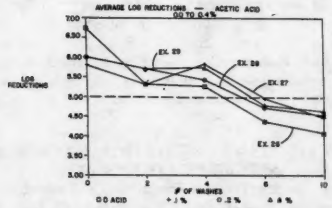
1. A method for disinfecting and imparting prolonged germicidal properties to a hard porous or nonporous surface comprising coating said surface with a liquid antimicrobial film-forming composition free of complexed inorganic metal salt, and removing the aqueous solvent from said coating to form a germicidal, water-resistant polymeric film there upon, said composition comprising a solution in an aqueous solvent of (i) an amount of a germicidal agent effective to impart prolonged renewable antimicrobial properties and (ii) a film-forming, water-soluble copolymer, said copolymer comprising:

(a) about 20–99.5 mol-% of said copolymer of a monomer having a carboxylic acid ester hydrophilic functional group;

(b) about 0.5–80 mol-% of said copolymer of a monomer

selected from the group consisting of an aromatic ester, a cycooalkyl ester, an ester mixture thereof of an alpha, beta-unsaturated carboxylic acid; and

(c) about 0.1 to 5 mol-% of said copolymer of a monomer having a hydrophilic amine group



wherein said antimicrobial film-forming composition imparts an immediate and prolonged germicidal character to the surface of application and once the water-resistant polymeric film is formed the prolonged germidical character of the film can be renewed by wiping with a dampened cloth.

4,883,829

PROCESS FOR PRODUCING POURABLE POWERED RUBBER CONTAINING FILLER

Hans-Juergen Smigerski, Marl, and Uwe Ernst, Borken, both of Fed. Rep. of Germany, assignors to Hüls Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Apr. 22, 1988, Ser. No. 184,785

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1987, 3723214

Int. Cl.[4] C08K *3/30, 3/36, 3/00*

U.S. Cl. 523—334 **17 Claims**

1. A process for producing a pourable powdered rubber, comprising the steps of:

(i) preparing an aqueous filler suspension by dispersing in water a filler, an acid, and a water-soluble salt of a metal selected from groups IIa, IIb, IIIa or VIII of the Periodic Table;

(ii) mixing said filler suspension with a rubber latex or an aqueous emulsion of a rubber solution to prepare a filler-containing rubber, wherein the pH of the mixture is in the range of 3.8 to 6.5; and

(iii) isolating and drying said filler-containing rubber to produce said pourable powdered rubber.

4,883,830

COATING RESIN COMPOSITION

Michiharu Kitabatake, Hiratsuka, and Akira Tominaga, Chigasaki, both of Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan

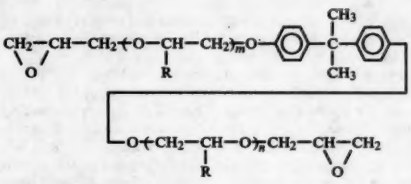
Filed Nov. 3, 1988, Ser. No. 266,895

Int. Cl.[4] C08G *59/04, 59/24*

U.S. Cl. 523—414 **14 Claims**

1. A coating resin composition comprising mainly an epoxy-polyamine resin obtained by adding (d) an amine compound having active hydrogen to an epoxy resin, said epoxy resin being a reaction product of

(a) a diepoxide compound represented by the following formula (I)


(I)

wherein R represents a lower alkyl group or $—CH_2OR'$ wherein R' represents a hydrocarbon group having 1 to 10 carbon atoms, and m+n is an integer of 1 to 6

(b) a bisphenol, and

(c) optionally, a bisphenol diglycidylether,

(d) an amine compound having active hydrogen.

4,883,831

MELAMINE-BASED LIGHT STABILIZERS FOR PLASTICS

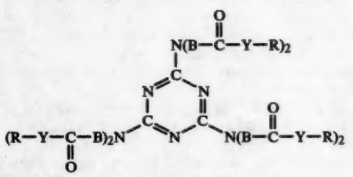
Richard V. Nelson, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Filed Dec. 15, 1988, Ser. No. 284,574

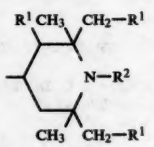
Int. Cl.[4] C08K *5/34*

U.S. Cl. 524—100 **8 Claims**

1. A compound of the formula


I

wherein R is the group



R^1 is selected from hydrogen and an alkyl group of 1–5 carbon atoms,

R^2 is selected from the group consisting of hydrogen, oxyl, hydroxyl, a straight or branched chain methylene-linked alkyl group of 1–18 carbon atoms, an alkanoyl group having 2–18 carbon atoms, an alkenyl group of 3–4 carbon atoms, an alkenoyl group of 3–6 carbon atoms, an alkynyl group of 3–6 carbon atoms, a cyanomethyl group, a 2,3-epoxypropyl group, a benzyl or alkylbenzyl group of 7–15 carbon atoms, a group $—CH_2CH(OR^3)—R^4$ and a group of the formula

$$—(CH_2)_m—C(O)—Z$$

wherein Z is a group selected from OR^5 and $—N(R^6)(R^7)$ when m is 1 or 0 and when m is 0, Z can be a group $—C(O)—OR^8$,

R^3 is selected from the group consisting of hydrogen, an aliphatic group of 1–18 carbon atoms, an araliphatic group and an alkanoyl group,

R^4 is selected from the group consisting of hydrogen, an alkyl group of 1–16 carbon atoms and phenyl,

R^5 is selected from the group consisting of an alkyl group of 1–18 carbon atoms, a cycloalkyl group of 5–12 carbon atoms, allyl, benzyl, phenyl, and a group of R,

R^6 and R^7, same or different, are selected from the group consisting of hydrogen, an alkyl group having 1–8 carbon atoms, a cycloalkyl group having 5–12 carbon atoms, an alkaryl group having 6–10 carbon atoms, an aralkyl group having 7–15 carbon atoms, and additionally R^6 and R^7, together with the N-atom to which they are attached, can form a 5–7 membered ring consisting of pyrrolidine, piperidine, and homopiperidine, and

R^8 is selected from the group consisting of an alkyl group of 1–18 carbon atoms, phenyl and benzyl,

B is a divalent alkylene group having 1–10 carbon atoms,

Y is selected from —O— and —NH—; and —NR^9 where R^9 is an alkyl group of 1–20 carbon atoms or the group R where R^1 and R^2 are as previously described.

4,883,832

PREPARATION OF POLYMER POLYOLS

Rudolpha C. Cloetens; Werner A. Lidy, both of Geneva, and Huy P. Thanh, Onex, all of Switzerland, assignors to BP Chemicals Limited, London, England

Division of Ser. No. 807,512, Nov. 22, 1985, Pat. No. 4,723,026. This application Jun. 24, 1987, Ser. No. 65,777

Claims priority, application United Kingdom, Apr. 24, 1984, 84/10480; Apr. 24, 1985, PCT/GB85/00176

Int. Cl.[4] C08K *5/24*

U.S. Cl. 524—265 **7 Claims**

1. A fluid polymer/polyol dispersion prepared in the presence of a free radical catalyst one or more monomers selected from the group consisting of styrene, acrylonitrile, methacrylonitrile and methyl methacrylate in a liquid polyol under polymerization conditions characterized in that the liquid polyol comprises:

(a) a polyether polyol having an average molecular weight in excess of 400 and a hydroxyl number in the range of 20 to 280; and

(b) a modified alcohol obtained by reacting an olefinically unsaturated functional group and at least one functional group attached to the silicon atom which is reactable with the hydroxyl groups on the alcohol.

4,883,833

PROCESS FOR PRODUCING A DRY GRANULAR PRODUCT

Ronald E. Hughes, P.O. Box 820, Davidson, N.C. 28036

Filed Jun. 15, 1988, Ser. No. 208,144

Int. Cl.[4] C08K *5/09*

U.S. Cl. 524—394 **4 Claims**

1. A process for producing a dry granular product in the form of an aqueous polymeric complex of sodium acetate trihydrate, comprising reacting dry sodium carbonate, acetic acid and a polymer emulsion selected from the group of silicone emulsions, acrylic emulsions, surfactant solutions, and polyvinylpyrrolidone solutions wherein the polymer is inert with respect to sodium carbonate and acetic acid so as to maintain the integrity of said polymer during said reaction.

4,883,834

PRIMER COMPOSITIONS

Shosaku Yamamoto; Kazuo Kakinuma, both of Yokohama; Fumio Sodeyama, Chigasaki; Junji Mayumi, Tsu, and Riichiro Maruta, Yokkaichi, all of Japan, assignors to Nippon Oil and Fats Company, Limited, Japan

Filed Jul. 13, 1987, Ser. No. 72,423

Claims priority, application Japan, Jul. 21, 1986, 61-171183

Int. Cl.[4] C08L *51/34, 53/01*

U.S. Cl. 524—504 **8 Claims**

1. A primer composition consisting essentially of a resin obtained by graft-polymerizing a styrene-butadiene-styrene block copolymer or its hydrogenated polymer with α,β-unsaturated carboxylic acid or its anhydride (component A), a crosslinking agent selected from the group consisting of self-reactive type compounds and polyisocyanate compounds together with a resin having an active hydrogen-containing functional group (component B) and an epoxy compound (component C), and having a weight ratio as solid content of component A to component B within a range of 99/1 ~ 60/40 and a weight ratio as solid content of components A + B to component C within a range of 100/1 ~ 10/50, wherein said α,β-unsaturated carboxylic acid or its anhydride is contained in said component A in an amount of 0.05 10% by weight.

4,883,835

FLAME RESISTANT ANTISTATIC POLYCARBONATE MOULDING COMPOUNDS

Hans-Josef Buysch; Norbert Schön, both of Krefeld, Fed. Rep. of Germany; Hans-Jürgen Kress, Pittsburgh, Pa.; Herbert Eichenauer, Dormagen, and Josef Buekers, Krefeld, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Fed. Rep. of Germany

Filed Mar. 31, 1988, Ser. No. 175,863

Claims priority, application Fed. Rep. of Germany, Apr. 17, 1987, 3713165; Apr. 17, 1987, 3713162; Aug. 15, 1987, 3727250

Int. Cl.[4] C08K *5/51;* **C08L** *51/00*

U.S. Cl. 524—504 **10 Claims**

1. Thermoplastic moulding compounds containing

(A) 20 to 90 parts by weight of a thermoplastic aromatic polycarbonate,

(B) 0 to 50 parts by weight of a graft polymer of

(B.1) 5 to 90 parts by weight of a mixture of

(B.1.1) 50 to 95% by weight of styrene, α-methyl styrene, nuclear substituted styrene, methyl methacrylate or mixtures thereof and

(B.1.2) 50 to 5% by weight of (meth)acrylonitrile, methylmethacrylate, maleic acid anhydride, N-substituted maleimide or mixtures thereof on

(B.2) 95 to 10 parts by weight of a rubber having a glass transition temperature of $T_G \leqq 10°$ C.,

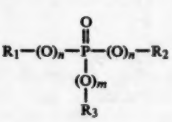
(C) 5 to 70 parts by weight of a thermoplastic copolymer of

(C.1) 50 to 95% by weight of styrene, α-methyl styrene, nuclear substituted styrene, methyl methacrylate or mixtures thereof and

(C.2) 50 to 5% by weight of (meth)acrylonitrile, methyl methacrylate, maleic acid anhydride, N-substituted maleimide or mixtures thereof, and

(D) 0 to 15 parts by weight of a low molecular weight or high molecular weight halogen compound based on 100 parts by weight of A + C + D and B when present, wherein the halogen content resulting from components A + D is to 3 to 10% by weight, based on the total weight of components A and D,

(E) 1 to 20 parts by weight, based on 100 parts by weight of A + C and B and D when present, of a phosphorus compound corresponding to the formula (I)



(I)

wherein

R_1, R_2 and R_3 denote, independently of one another, an unsubstituted or halogenated C_1 to C_8 alkyl or an unsubstituted or halogenated C_6 to C_{20} aryl and

n and m denote, independently of one another, 0 or 1, and

(F) 0.05 to 1.0 parts by weight, based on 100 parts by weight of A + C and B and D when present, of a tetrafluoroethylene polymer having average particle sizes of from 0.05 to 1000 μm and a density of from 1.2 to 2.3 g/cm^3 and

(G) 0.2 to 5.0 parts by weight, based on 100 parts by weight of the sum of A to G, of one or more antistatic agents obtained from a polyalkylene ether which has been modified with a polymer of at least one of (meth)acrylates or other vinyl monomers.

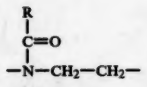
4,883,836

BLEND OF POLYCARBONATE AND POLYAMIDE COMPATIBILIZED WITH A POLYALKYLOXAZOLINE

Bruce P. Thill, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 31, 1988, Ser. No. 264,929
Int. Cl.[4] C08L 77/00
U.S. Cl. 525—66 16 Claims

1. A thermoplastic molding composition, comprising:
(A) an aromatic polycarbonate;
(B) a polyamide;
(C) a compatibilizing amount of a polyalkyloxazoline characterized by repeated units corresponding to the general formula:



wherein R is a monovalent C_1–C_4 alkyl radical; and
(D) an impact modifying rubber.

4,883,837

COMPATIBLE BLENDS OF POLYOLEFINS WITH THERMOPLASTIC POLYURETHANES

Vincent S. Zabrocki, Newark, Ohio, assignor to The Dow Chemical Company, Midland, Mich.

Filed Jun. 24, 1988, Ser. No. 211,190
Int. Cl.[4] C08L 75/04
U.S. Cl. 525—66 16 Claims

1. A thermoplastic compatible blended composition comprising A. from about 15 to about 60 weight percent of a polyolefin, B. from about 30 to about 70 weight percent of a thermoplastic polyurethane, and C. from about 10 to about 35 weight percent of at least one modified polyolefin defined as a random, block or graft olefin copolymer having in a main or side chain thereof a functional group selected from the class consisting of carboxylic acid, carboxylate ester, carboxylic acid anhydride, carboxylate salts, amide, epoxy, hydroxy, and acyloxy.

4,883,838

SOLUBLE ACRYLATE COPOLYMER CONTAINING CARBOXYL GROUPS, PROCESSES FOR ITS PREPARATION AND COATING AGENTS BASED ON THE ACRYLATE COPOLYMER

Werner Jung, Ascheberg, and Axel Sievers, Munster, both of Fed. Rep. of Germany, assignors to BASF Lacke & Farben AG, Münster, Fed. Rep. of Germany

Division of Ser. No. 060,243, May 29, 1987, Pat. No. 4,839,448. This application Mar. 2, 1989, Ser. No. 318,114
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, 354858
Int. Cl.[4] C08F 8/00
U.S. Cl. 525—119 16 Claims

1. A coating agent containing as an essential binder,
(A) an acrylate copolymer prepared by copolymerizing monomers having at least two polymerizable, olefinically unsaturated double bonds, monomers which carry functional groups and other polymerizable monomers with an olefinically unsaturated double bond, the acrylate copolymer containing carboxyl groups, wherein more than 3 to 30% by weight, based on the total weight of the monomers, of a monomer with at least 2 polymerizable, olefinically unsaturated double bonds is copolymerized into the acrylate copolymer and the acid number of the acrylate copolymer is 15 to 200, and
(B) a compound containing at least two epoxide groups per molecule,
the ratio of (A) to (B) being such that the ratio of the acid groups of (A) to the epoxide groups of (B) is in the range of 0.5:3 to 2:0.5, and a crosslinking catalyst if appropriate.

4,883,839

STAIN-RESISTANT AGENTS FOR TEXTILES

Patrick H. Fitzgerald, Pitman, N.J.; Nandakumar S. Rao; Yashavant Vinod, both of Hockessin, Del., and Jeffrey R. Alender, Wilmington, Del., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 136,033, Dec. 21, 1987, abandoned. This application Dec. 6, 1988, Ser. No. 280,406
Int. Cl.[4] C08L 61/06
U.S. Cl. 525—136 14 Claims

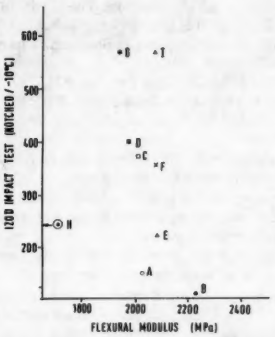
1. A composition useful in imparting stain resistance to polyamide textile substrates comprising between about 95 and 30 weight % of a hydrolyzed polymer of maleic anhydride and one or more ethylenically unsaturated aromatic monomers and between about 5 weight % and 70 weight % of a sulfonated phenol-formaldehyde condensation product which is useful as a dye-resist agent, a dye-fixing agent, a dye-reserving agent, or an agent which improves the wet-fastness of dyeings on polyamide fibers.

4,883,840

ELASTOMER MODIFIED POLYCARBONATE COMPOSITIONS OF IMPROVED IMPACT STRENGTH

Silvestro Cartasegna, Brussels, Belgium, assignor to Exxon Chemical Patents Inc., Linden, N.J.

Filed Dec. 17, 1987, Ser. No. 133,945
Claims priority, application United Kingdom, Dec. 23, 1986, 8630819
Int. Cl.[4] C08L 69/00
U.S. Cl. 525—146 16 Claims



1. A thermoplastic polycarbonate composition of improved impact strength which comprises a polymer blend of:
(a) a thermoplastic polycarbonate plastics material; and
(b) an impact modifier comprising (i) an elastomer component which contains from 45–55 wt.% ethylene selected from highly amorphous ethylene-higher alpha olefin copolymers, highly amorphous ethylene-higher alpha olefin-polyene terpolymers and mixtures thereof, and (ii) a plastics component selected from ethylene homo- and copolymers.

4,883,841

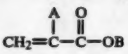
POLYCARBONATE COMPOSITIONS HAVING MULTIPLE PHASE IMPACT MODIFIERS THEREIN

Changkiu K. Riew, Akron, and Roger E. Morris, Cuyahoga Falls, both of Ohio, assignors to The B.F. Goodrich Company, Akron, Ohio

Filed Oct. 5, 1988, Ser. No. 253,527
Int. Cl.[4] C08L 69/00
U.S. Cl. 525—148 15 Claims

1. A polycarbonate composition having improved impact resistance, comprising:

a polycarbonate and a multiple-phase impact modifier, free of any grafting or crosslinking agents, said impact modifier containing at least an elastomer phase and a plastic polymer phase, wherein said elastomer has a glass transition temperature of 0° C. or less, said elastomer phase containing one or more polymers made from an alkyl acrylate having the formula



wherein A is hydrogen or an alkyl having from 1 to 3 carbon atoms, and B is an alkyl portion having from 1 to 18 carbon atoms, the number average molecular weight as determined by gel permeation chromatography of said elastomer being at least 100,000, and wherein the amount of said multiple-phase impact modifier is from about 1 part to about 30 parts by weight for every 100 parts by weight of said polycarbonate.

4,883,842

RESIN COMPOSITION

Shigeo Tanaka; Jiro Sakai; Tomohisa Fukao, all of Ichihara; Kizuku Wakatsuki, Takatsuki, and Kazuki Wakamatsu, Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Mar. 28, 1988, Ser. No. 172,786
Claims priority, application Japan, Mar. 30, 1987, 62-79293
Int. Cl.[4] C08L 23/24, 23/10, 23/18
U.S. Cl. 525—240 5 Claims

1. A resin composition, the transparency of which changes reversibly with temperature, comprising

1 to 99% by weight of a polymer A which has a refractive index largely dependent on temperature and is a polymer of a straight-chain α-olefin having 14 or more carbon atoms or a copolymer of two or more straight-chain α-olefins having 14 or more carbon atoms and

1 to 99% by weight of a polymer B which has a refractive index slightly dependent on temperature and is a polymer of an α-olefin having 3–6 carbon atoms, a copolymer of two or more α-olefins or a methacrylic acid ester polymer,

the polymers A and B having refractive indexes which permit satisfaction of the relation:

$$a \leqq 0.015 \text{ and } b - a \geqq 0.005$$

wherein a and b are the minimum absolute value and the maximum absolute value, respectively, of the difference between the refractive indexes of the polymers A and B in a temperature range of 20° C to 100° C.

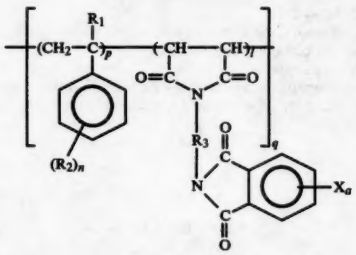
4,883,843

IMIDE BOND-CONTAINING RESINS AND FLAME RETARDANTS COMPRISING SAID RESINS

Akira Taniuchi; Hirohito Komori, and Koichi Niwa, all of Kyoto, Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Filed Jan. 23, 1989, Ser. No. 300,406
Claims priority, application Japan, Jan. 29, 1988, 63-19843
Int. Cl.[4] C08F 8/32
U.S. Cl. 525—327.6 2 Claims

1. A flame retardant which comprises an imide bond-containing resin of the general formula



wherein R_1 is H or CH_3, R_2 is H, Cl, Br, F or CH_3, R_3 is a straight or branched alkylene group containing 1 to 6 carbon atoms or an aromatic nucleus, X is Br, Cl or F, l is equal to 1, m is an integer of 1 to 4, n is an integer of 1 to 5, p is an integer of 1 to 4 and q is a number equal to 1 to 100.

4,883,844

SUBSTITUTED STYRYLAZA EPOXY RESINS

Robert E. Hefner, Jr., Lake Jackson, Tex.; John W. Robinson, Niagara Falls, N.Y., and Jimmy D. Earls, Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

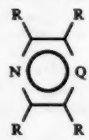
Continuation-in-part of Ser. No. 101,048, Sep. 5, 1987, abandoned. This application Dec. 6, 1988, Ser. No. 280,414
Int. Cl.[4] C08G 16/04, 59/02
U.S. Cl. 525—472 4 Claims

1. A substituted epoxy resin composition containing styrylaza groups prepared by reacting

(A) a substituted hydroxystyrylaza compound prepared by reacting

(1) one or more monohydroxy aromatic aldehydes wherein the ortho and para positions from the hydroxy group having no aldehyde groups are substituted by groups inert to condensation with alkyl azines, and

(2) one or more methylated azine compounds having the formula

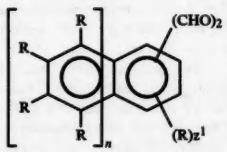


wherein Q is N or C—R, and each R is independently hydrogen, a halogen, a hydrocarbyl or hydrocarbyloxy group having from 1 to about 20 carbon atoms, nitro, nitroso, nitrile,

allyl or a methallyl group; E is a hydrocarbyl group

having from 1 to about 20 carbon atoms; with the proviso that the total number of methyl groups (R=—CH_3) substituted on the ring is in the range from 2 to 4, and, optionally,

(3) one or more aromatic dialdehydes having the formula



wherein each R is independently hydrogen, a halogen, a hydrocarbyl or hydrocarbyloxy group having from 1 to about 20 carbon atoms, nitro, nitroso, nitrile,

allyl or a methallyl group; E is a hydrocarbyl group having from 1 to about 20 carbon atoms; n has a value of zero or 1 and when n is zero, z^1 is four, when n is 1, z^1 is two, and,

(B) one or more epihalohydrins, in the presence or one or more basic-acting substances.

4,883,845

CURABLE COMPOSITION OF POLYETHER SULFONE OR POLYETHER KETONE COPOLYMER AND UNSATURATED IMIDE

Friedrich Stockinger, Courtepin, and Werner Stauffer, Fribourg, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 23, 1989, Ser. No. 299,294

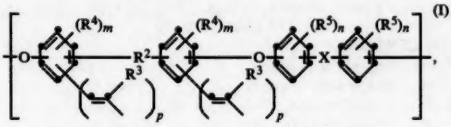
Claims priority, application Switzerland, Feb. 1, 1988, 336/88

Int. Cl.[4] C08G 65/48

U.S. Cl. 525—534 **10 Claims**

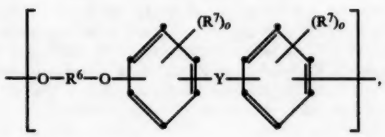
1. A curable composition comprising

(a) a copolyether resin having end groups —OR^1 linked direct to phenyl nuclei and containing 1 to 50 mol% of repeating structural units of formula I



(I)

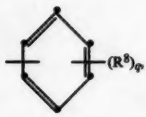
and 99 to 50 mol% of repeating structural units of formula II



(II)

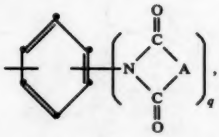
the percentages being based in each case on the total number of repeating structural units in each molecule, in which end groups —OR^1 or formulae I and II above

R^1 is hydrogen or a radical of formulae III to VI

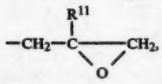


(III)

(IV)



(V)



(VI)

R^2 is a direct C—C bond or a group of formula —C_rH_{2r}—, —O—, —S—, —CO— or —SO_2—,

r is 1 to 20,

R^3 is hydrogen or methyl,

R^4, R^5 and R^7 are each independently of one another C_1–C_4alkyl, C_1–C_4alkoxy or chloro or bromo,

m, n and o are each independently of one another 0, 1 or 2,

p is 1 or 2,

R^6 is a divalent radical of a bisphenol after removal of both phenolic hydroxyl groups, which radical is unsubstituted or substituted by one or two C_1–C_4alkyl or C_1–C_4alkoxy groups or chlorine or bromine atoms,

X and Y are each independently of the other —CO— or —SO_2—,

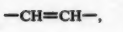
R^8 is vinyl, ethynyl, allyl, methallyl, prop-1-enyl or 2-methylprop-1-enyl,

R^9 and R^{10} are each independently of the other hydrogen, allyl or methallyl,

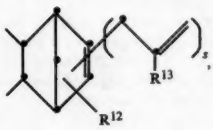
R^{11} is hydrogen or methyl,

q is 1 or 2,

A is a group of formula VIIa or VIIb



(VIIa)



(VIIb)

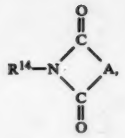
wherein

R^{12} and R^{13} are each independently of the other hydrogen or methyl, and

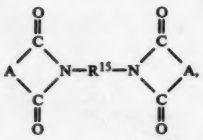
s is 0, 1 or 2, and

(b) at least one compound of formula VIII, IX or X

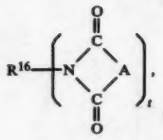
(VIII)



(IX)



(X)



wherein

A is as defined above,

t is an integer from 3 to 12,

R^{14} is C_1–C_{20}alkyl, C_5–C_{12}cycloalkyl, C_6–C_{18}aryl, C_7–C_{20}-aralkyl or a C_4–C_{18}heterocycle containing one or two N, S or O atoms,

R^{15} is C_2–C_{50}alkylene, C_5–C_{12}cycloalkylene, C_6–C_{18}arylene, C_7–C_{20}aralkylene or a divalent C_4–C_{18}heterocyclic radical containing one or two N, O or S atoms, and

R^{16} is a radical of valency t of an aromatic polyamine after removal of the t amino groups.

4,883,846

ANIONIC POLYMERIZATION OF PURIFIED MONOVINYLIDENE AROMATIC MONOMER FEED STOCK

Eugene R. Moore; Brian D. Dalke; Michael T. Malanga, and Gary M. Poindexter, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 20, 1987, Ser. No. 40,508

Int. Cl.[4] C08F *2/06, 4/48, 6/10*

U.S. Cl. 526—73 **20 Claims**

1. A method for anionically polymerizing monovinylidene aromatic monomers comprising:

purifying a monovinylidene aromatic monomer feed stock by, (1) removing reactive gases from said feed stock, (2) contracting said feed stock from which reactive gases have been removed with activated alumina, and (3) hydrogenating said activated alumina-contacted feed stock;

cooling said feed stock to a temperature at which an anionic initiator preferentially reacts with impurities remaining in the feed stock and initiates polymerization without substantial propagation of polymerization;

uniformly dispersing the total quantity of anionic initiator desired into a batch of said feed stock while maintaining said feed stock at said temperature; and

subsequently increasing the temperature of said feed stock and initiator to a temperature at which polymerization of the monovinylidene aromatic monomer proceeds exothermically.

4,883,847

PROCESS TO TERMINATE AN OLEFIN POLYMERIZATION REACTION

Linus Leung, Naperville, Ill., and John B. Rogan, Tarpon Springs, Fla., assignors to Amoco Corporation, Chicago, Ill.

Filed Oct. 27, 1988, Ser. No. 263,000

Int. Cl.[4] C08F *2/42, 6/12*

U.S. Cl. 526—84 **7 Claims**

1. A method for termination of a polymerization reaction of a reactive olefin under emergency conditions to prevent a "run-away" reaction in the presence of a Lewis acid-type catalyst, and to recover polymer therefrom, wherein the reactor is a stirred, boiling-type reactor, reactor contents comprise a liquid phase and a vapor phase, which method comprises:

(a) storing in a pressure vessel a quantity of diglyme sufficient to terminate said polymerization reaction, said pressure vessel connected to said reactor by a transfer line with means to control injection of said diglyme into said reactor,

(b) subjecting said diglyme in said pressure vessel to a pressure differential at least 50 psig greater than pressure in said reactor to cause said diglyme to be injected into said reactor within a period of 30 seconds or less,

(c) monitoring pressure of said polymerization reaction,

(d) injecting said diglyme into said reactor by said transfer line when termination pressure of said reaction is within the range of from about 100 psig to about 250 psig to terminate said reaction within 30 seconds or less and to form a diglyme catalyst complex,

(e) transferring contents of said reactor to a water wash vessel to decompose said complex and to form a water phase and a polymer phase, and

(f) recovering said polymer phase.

4,883,848

METHOD FOR PRODUCING AN OLEFIN POLYMER

Yoshinori Suga, Machida; Eiji Tanaka, Kawasaki; Yasuo Maruyama, Tokyo, and Eiji Isobe, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Tokyo, Japan

Continuation of Ser. No. 51,592, May 20, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 320,859

Claims priority, application Japan, May 21, 1986, 61-116732

Int. Cl.[4] C08F *4/02, 10/06*

U.S. Cl. 526—124 **9 Claims**

1. A method for producing an olefin polymer, which comprises polymerizing or copolymerizing propylene in the presence of a catalyst comprising (a) a titanium-containing solid catalyst component, (b) an organometallic compound of a metal of Groups I-III of the Periodic Table and an electron donative compound (c), said solid catalyst component (a) being obtained by treating (A) a magnesium compound of the formula $Mg(OR^1)_n(OR^2)_{2-n}$ wherein each of R^1 and R^2 is an alkyl group, an aryl group or an aralkyl group, and n is $2 \geqq n \geqq 0$, with (B) an ester of carboxylic acid as electron donative compound, (C) a silicon compound of the formula $Si(OR^3)_4$ wherein R^3 is an alkyl group, an aryl group or an aralkyl group and (D) a titanium compound which is titanium tetrachloride, titanium tetrabromide, titanium tetraiodide or a titanium halide-alcoholate, the amount of said titanium compound (D) being 1–40 mol per mol of said magnesium compound (A), the amount of said silicon compound (C) being 0.0–10 mol per mol of said magnesium compound (A), and the amount of said ester electron donative compound (B) being 0.01–10 mol per mol of said magnesium compound (A).

4,883,849

NITROGEN COMPOUNDS THAT DELAY THE METATHESIS POLYMERIZATION OF CYCLOOLEFINS

Albert S. Matlack, Hockessin, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Dec. 30, 1988, Ser. No. 291,940
Int. Cl.[4] C08F *4/44, 32/00, 36/00*
U.S. Cl. 526—141 12 Claims

1. A polymerization feed composition comprising:
(a) a metathesis polymerizable cycloolefin;
(b) a metathesis polymerization catalyst;
(c) a catalyst activator comprising an alkyl aluminum compound; and
(d) a reaction rate moderator, wherein said reaction moderator is a nitrogen compound represented by the formula:

wherein X represents an aryl, alkaryl, or haloaryl group; Y represents an alkyl group or hydrogen and Z represents an alkyl, aralkyl, or cycloalkyl group or hydrogen, and wherein when neither Y nor Z represent hydrogen, X, Y and Z all must represent alkyl groups.

4,883,850

PROCESS FOR PREPARATION OF POLYMERS BY SUSPENSION POLYMERIZATION OF VINYL MONOMER IN THE PRESENCE OF HYDROPHOBICALLY MODIFIED WATERSOLUBLE, NONIONIC CELLULOSE ETHER POLYMER IN COMBINATION WITH ELECTROLYTE

Daniel H. Craig, Hockessin, Del., assignor to Aqualon Company, Wilmington, Del.

Continuation-in-part of Ser. No. 64,362, Jun. 22, 1987, abandoned. This application May 23, 1988, Ser. No. 197,713
Int. Cl.[4] C08F *2/20*
U.S. Cl. 526—200 19 Claims

1. A process for forming a vinyl suspension polymer by suspension polymerization, comprising suspension polymerization of at least one vinyl monomer in the presence of (a) from about 0.01% to about 0.4% by weight, based on the total monomers, of at least one water-soluble, nonionic hydrophobically modified cellulose ether polymer selected from the group consisting of hydrophobically modified hydroxyethyl cellulose, hydrophobically modified hydroxypropyl cellulose, and hydrophobically modified methyl cellulose, and (b) at least one inert inorganic electrolyte.

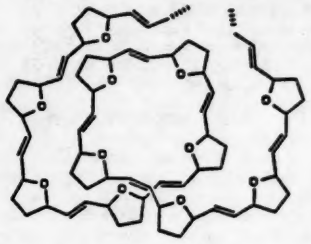
4,883,851

RING OPENING METATHESIS POLYMERIZATION OF STRAINED CYCLIC ETHERS

Robert H. Grubbs, South Pasadena, and Bruce M. Novak, El Sobrante, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Continuation-in-part of Ser. No. 223,406, Jul. 25, 1988, abandoned. This application Jun. 22, 1989, Ser. No. 371,982
Int. Cl.[4] C08F *24/00*
U.S. Cl. 526—268 22 Claims

1. A process for preparing polymers of 7-oxanorbornene and its derivatives comprising selective ring opening metathesis polymerization thereof in solution in the presence of a catalyst selected from the group consisting of ruthenium and osmium



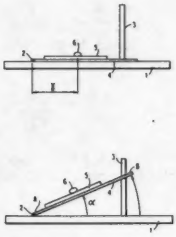
ions complexed with sigma-donor ligands and 4- and 5-coordinated tungsten alkylidene complexes.

4,883,852

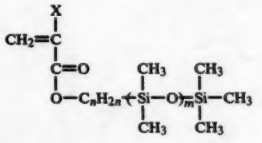
ANTIFOULING COATING

Shigeru Masuoka, and Hiroshi Doi, both of Hyogo, Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 947,296, Dec. 29, 1986. This application Jun. 22, 1988, Ser. No. 209,813
Claims priority, application Japan, Dec. 27, 1985, 60-298918; May 30, 1986, 61-126988; Oct. 27, 1986, 61-255473
Int. Cl.[4] C08F *30/08*
U.S. Cl. 526—279 9 Claims



1. An antifouling paint that contains as its essential components a polymer of one or more of the monomers A represented by formula (1) and/or a copolymer composed of one or more of the monomers A and one or more monomers B selected from the group consisting of a methacrylate ester, an acrylate ester, a maleate ester, a fumarate ester, styrene, vinyltoluene, α-methylstyrene, vinyl acetate, butadiene, acrylamide, acrylonitrile, methacrylic acid, acrylic acid, and maleic acid that are radical-copolymerizable with said monomer A:



(1)

wherein X is a hydrogen atom or a methyl group; n is an integer of 2 to 4; and m signifies the average degree of polymerization and ranges from 0 to 70.

4,883,853

COPOLYMERS OF ETHYLENE AND 2,4,4-TRIMETHYLPENTENE-1

John Hobes, Dinslaken; Wolfgang Payer, Wesel, and Ludger Bexten, Hünxe, all of Fed. Rep. of Germany, assignors to Ruhrchemie Aktiengesellschaft, Fed. Rep. of Germany

Filed May 29, 1987, Ser. No. 55,722

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1986, 3621394

Int. Cl.[4] C08F *210/02, 210/14*

U.S. Cl. 526—329 **14 Claims**

1. A copolymer of ethylene containing, per 100 parts by weight of ethylene, 0.2 to 5.0 parts by weight of 2,4,4-trimethylpentene-(1) and optionally 2.0 to 20.0 parts by weight of at least one third member taken from the class consisting of vinyl esters, vinyl ethers, and esters of acrylic acid or methacrylic acid with aliphatic alcohols of 1 to 8 carbon atoms, said copolymer having a melt index MFI (190/2.16) of 0.4 to 20 g/10 min.

4,883,854

HYDROXYL FUNCTIONAL MONOMERS

Arthur J. Coury, St. Paul, and Christopher M. Hobot, Mound, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Filed Sep. 30, 1988, Ser. No. 251,261

Int. Cl.[4] C08G *18/38*

U.S. Cl. 528—28 **14 Claims**

1. Urethane polyols, having the general formula $(HO—CH_2—CH_2—OOC—NX)_n—R$, wherein "R" represents a hydrocarbon moiety, "N" represents a primary or secondary amine group, "n" is a number equal to or greater than 2, and "X" represents a hydrogen or a hydrocarbon moiety.

4,883,855

ETHYLENICALLY UNSATURATED POLYETHER SULFONE OR POLYETHER KETONE COPOLYMER

Friedrich Stockinger, Courtepin, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

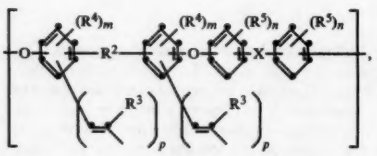
Filed Jan. 23, 1989, Ser. No. 299,291

Claims priority, application Switzerland, Feb. 1, 1988, 337/88

Int. Cl.[4] C08G *65/48*

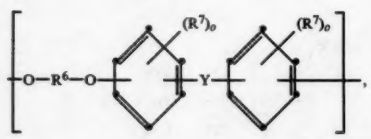
U.S. Cl. 528—171 **9 Claims**

1. A copolyether resin having end groups $-OR^1$ linked direct to phenyl nuclei and containing 1 to 50 mol % of repeating structural units of formula I



(I)

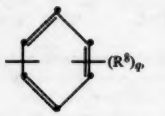
and 99 to 50 mol % of repeating structural units of formula II



(II)

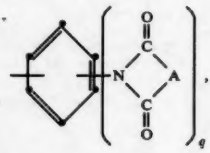
the percentages being based in each case on the total number of repeating structural units in each molecule, in which formulae I and II above

R^1 is hydrogen or a radical of formulae III to IV

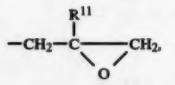


(III)

(IV)



(V)



(VI)

R^2 is a direct C—C bond or a group of formula $—C_rH_{2r}—$, —O—, —S—, —CO— or $—SO_2—$,

r is 1 to 20,

R^3 is hydrogen or methyl,

R^4, R^5 and R^7 are each independently of one another C_1–C_4alkyl, C_1–C_4-alkoxy or chloro or bromo,

m, n and o are each independently of one another 0, 1 or 2,

p is 1 or 2,

R^6 is a divalent radical of a bisphenol after removal of both phenolic hydroxyl groups, which radical is unsubstituted or substituted by one or two C_1–C_4alkyl or C_1–C_4alkoxy groups or chlorine or bromine atoms,

X and Y are each independently of the other —CO— or $—SO_2—$,

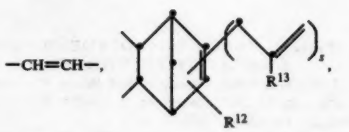
R^8 is vinyl, ethynyl, allyl, methallyl, prop-1-enyl- or 2-methylprop-1enyl,

R^9 and R^{10} are each independently of the other hydrogen, allyl or methallyl,

R^{11} is hydrogen or methyl,

q is 1 or 2,

A is a group of formula VII or VIII



(VII) (VIII)

wherein

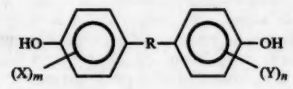
R^{12} and R^{13} are each independently of the other hydrogen or methyl, and s is 0, 1 or 2.

4,883,856
FLAME-RESISTANT POLYCARBONATES, CONTAINING IN THEIR POLYMERIC CHAIN UNITS DERIVING FROM MONO-HALOGENATED TETRA-PHENYL COMPOUNDS

Alberto Petri, Milan, Italy, assignor to Enichem Tecnoresine, S.p.A., Palermo, Italy

Filed Jul. 13, 1988, Ser. No. 218,818
Claims priority, application Italy, Sep. 11, 1987, 21895 A/87
Int. Cl.[4] C08G *63/68*
U.S. Cl. 528—202 **6 Claims**

1. Thermoplastic, branched, high-molecular-weight polycarbonates endowed with flame-resistance properties characterized in that they contain in their polymeric chain, units derived from a di-hydroxy-aromatic compound having the formula:



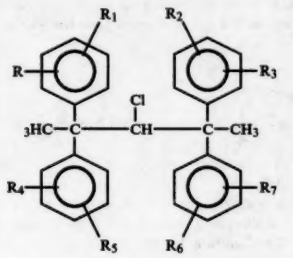
(I)

wherein:

R is a single bond; or a substituted or non-substituted, linear or branched alkyl group containing from 1 to 5 carbon atoms; or a group selected from O, S, SO_2, and CO;

X and Y are the same as, or different from each other and are selected from H and CH_3;

m and n are integers, the same as, or different from each other, and are selected from 1 to 4; and units derived from a mono-halo-tetra-phenyl compound having the formula:



(II)

wherein

R, R_2, R_4, R_6 are OH;

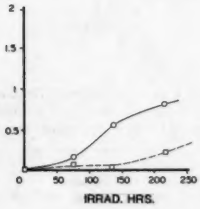
R_1, R_3, R_5, R_7, are the same as, or different, from one another, and are selected from OH, H, and a linear or branched alkyl group having from 1 to 5 carbon atoms.

4,883,857
PRODUCTION OF PHOTODEGRADABLE POLYESTER PLASTICS

James E. Guillet, Don Mills; Ilse Treurnicht, and Ruey S. Li, both of Toronto, all of Canada, assignors to Ecoplastics Limited, Ontario, Canada

Filed Sep. 30, 1988, Ser. No. 252,799
Claims priority, application Canada, Sep. 30, 1987, 550526
Int. Cl.[4] C08G *63/02*
U.S. Cl. 528—272 **19 Claims**

1. A process for preparing condensation polymers having accelerated photodegradability and containing keto carbonyl groups, either in the backbone polymeric chain or in a side group adjacent to the backbone polymeric chain, which comprises subjecting a high molecular weight thermoplastic condensation polymer capable of chain scission upon heating, in the substantial absence of oxygen, to thermal treatment to cause polymer ester interchange reaction thereof and so to form condensation polymer products therefrom, in the presence of a keto carbonyl group containing compound containing at least two chemical groups reactive with the condensation polymer products so formed, the thermal treatment being conducted under conditions such that said compound chemically reacts with the condensation polymer products to reform high molecular weight condensation polymer chains containing keto carbonyl groups.

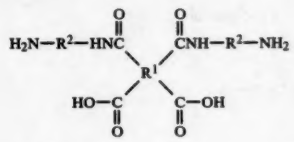


4,883,858
THERMOSETTING RESIN FROM AMINE TERMINATED AMIC ACID AND BIS-MALEIMIDE

Masayuki Takemoto, Yokohama; Osamu Nagura, Chigasaki; Yukio Nomura, and Minoru Yasuda, both of Yokohama, all of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

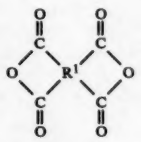
Filed Aug. 19, 1988, Ser. No. 234,411
Claims priority, application Japan, Aug. 25, 1987, 62-211164; Jun. 28, 1988, 63-160362; Jul. 1, 1988, 63-164656
Int. Cl.[4] C08G *69/14, 69/26, 73/10*
U.S. Cl. 528—322 **5 Claims**

1. A premix for a thermosetting resin, comprising, as a first essential component, an amine-terminated amic acid expressed by the formula (I).



(I)

in which R^1 denotes a tetravalent aromatic residue having 6 to 20 carbon atoms and R^2 denotes a divalent organic residue having 2 to 20 carbon atoms, said amic acid being produced by reacting a tetracarboxylic dianhydride represented by the formula (II),

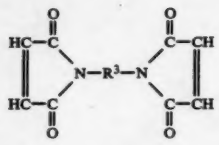


(II)

wherein R^1 has the same meaning as defined above, with a diamine compound represented by the formula (III),

$$H_2N—R^2—NH_2 \quad \text{(III)}$$

wherein R^2 has the same meaning as defined above, and, as a second essential component, an N,N'-bismaleimide of the formula (IV),



(IV)

wherein R^3 denotes a divalent organic residue having 2 to 20 carbon atoms, the mole ratio of [N,N'-bismaleimide]/[amine-terminated amic acid] being in the range from 1 to 3.

4,883,859

PROCESS FOR PRODUCING HYDROXYLATED POLYBUTADIENE

Richard Audry, Beaumont-le-Roger; Gerard Krempf, Sainte-Foy-les-Lyon, and Jackie Perono, Lyons, all of France, assignors to ATOCHEM, Paris La Defense, France

Filed Jun. 10, 1988, Ser. No. 205,086

Claims priority, application France, Jun. 15, 1987, 87 08571

Int. Cl.[4] C08F 6/08

U.S. Cl. 528—484 **11 Claims**

1. In the process of producing hydroxylated polybutadiene from a diene monomer in the presence of hydrogen peroxide and a solvent, wherein the solvent is recovered by distillation for reuse; after separation of the hydroxylated polybutadiene from a mixture containing such solvent and reaction impurities, the improvement comprising subjecting said mixture to the action of an alkali metal hydroxide or a hydrazine prior to distillation.

4,883,860

TRIAZINE-BASED LIGHT STABILIZERS FOR PLASTICS

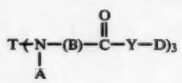
Richard V. Nelson, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Filed Dec. 15, 1988, Ser. No. 284,573

Int. Cl.[4] C08K 5/34

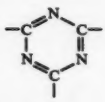
U.S. Cl. 524—98 **11 Claims**

1. A compound of the formula



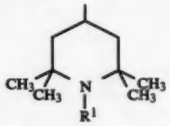
I

where T is the trivalent triazine radical



II

and where A is the hindered piperidino moiety



wherein R^1 is selected from the group consisting of hydrogen, oxyl, hydroxyl, a straight or branched chain methylene-linked alkyl group of 1–18 carbon atoms, an alkanoyl group having 2–18 carbon atoms, an alkenyl group of 3–4 carbon atoms, an alkenyl group of 3–6 carbon atoms, an alkynyl group of 3–6 carbon atoms, a cyanomethyl group, a 2,3-epoxypropyl group, a benzyl or alkylbenzyl group of 7–15 carbon atoms, a group $—CH_2CH(OR^2)—^3$ and a group of the formula

$$—CH_2CH(OR^2)_m—C(O)—Z$$

wherein Z is a group selected from $—OR^4$ and $—N(R^5)(R^6)$ when m is 1 or 0 and when m is 0, Z can be a group —C(O)—OR^7,

R^2 is selected from the group consisting of hydrogen, an aliphatic group of 1–18 carbon atoms, an araliphatic group and an alkanoyl group,

R^3 is selected from the group consisting of hydrogen, an alkyl group of 1–16 carbon atoms and phenyl,

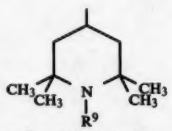
R^4 is selected from the group consisting of an alkyl group of 1–18 carbon atoms, a cycloalkyl group of 5–12 carbon atoms, allyl, benzyl, phenyl, and a group of formula A,

R^5 and R^6, same or different, are selected from the group consisting of hydrogen, an alkyl group having 1–8 carbon atoms, a cycloalkyl group having 5–12 carbon atoms, an aryl group having 6–10 carbon atoms, an aralkyl group having 7–15 carbon atoms, and additionally R^5 and R^6, together with the N-atom to which they are attached, can form a 5–7 membered ring consisting of pyrrolidine, piperidine, and homopiperidine,

R^7 is selected from the group consisting of an alkyl group of 1–18 carbon atoms, phenyl and benzyl,

B is an alkylene group having 1–10 carbon atoms,

Y is selected from the group consisting of —O—, —NH—, and $—N(R^8)$- where R^8 represents an alkyl group of 1–20 carbon atoms or the group D, and D is the group



where R^9 is oxyl, hydroxyl, hydrogen, an alkyl group of 1–18 carbon atoms, an alkenyl group of 3–4 carbon atoms or an alkynyl group of 3–4 carbon atoms.

4,883,861

CYSTEINE-RICH PEPTIDES HAVING GAMMA-GLUTAMIC ACID AND BETA-ALANINE UNITS, A PROCESS FOR THEIR PREPARATION AND THEIR USE

Erwin Grill; Ernst-Ludwig Winnacker, and Meinhart H. Zenk, all of Munich, Fed. Rep. of Germany, assignors to Consortium fur Elektrochemische Industrie GmbH, Munich, Fed. Rep. of Germany

Filed Mar. 17, 1987, Ser. No. 26,833

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1986, 3613758

Int. Cl.[4] C07K 7/02, 7/10

U.S. Cl. 530—326 **4 Claims**

1. A peptide having the formula:

$$(\gamma\text{-Glu-Cys})_n\beta\text{-Ala},$$

wherein,

n is an integer from 2 to 11;

γ-Glu represents γ-glutamic acid;

Cys represents cysteine; and

β-Ala represents β-alanine.

4,883,862

MERCAPTOSUCCINYL GLYCYL-GLYCYL-GLYCINE A COMPLEX THEREOF WITH TC-99M, AND METHODS OF MAKING THE SAME

Lakshman R. Chervu, Larchmont; Kuldeep K. Bhargava, Bronx, and M. Donald Blaufox, Rye, all of N.Y., assignors to Albert Einstein College of Medicine - of Yeshiva University, Bronx, N.Y.

Filed Apr. 13, 1988, Ser. No. 181,227
Int. Cl.[4] H61K *37/02;* C07K *5/08*
U.S. Cl. 530—331 17 Claims

1. The compound mercaptosuccinyl glycyl-glycyl-glycine.

4,883,863

TRIPEPTIDE DERIVATIVES AND ANTIPLASMIN AGENTS CONTAINING THE SAME

Yoshihito Abe; Katsuhiro Yaginuma, both of Koriyama; Takeshi Nagasawa, Urawa, and Katsumasa Kuroiwa, Koriyama, all of Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan

Filed Oct. 13, 1988, Ser. No. 247,455
Claims priority, application Japan, Oct. 30, 1987, 62-274896
Int. Cl.[4] A61K *37/02;* C07K *5/08*
U.S. Cl. 530—331 6 Claims

1. A tripeptide derivative represented by the general formula:

A—aaa(B)—Phe—Lys—C (I)

wherein A is an alkyloxycarbonyl group, an unsubstituted acyl group, a substituted acyl group having an aryl group as a substituent, a substituted acyl group having an aryloxy group as a substituent, a cycloalkylcarbonyl group, an unsubstituted aroyl group, a substituted aroyl group having an alkyl group as a substituent, a formyl group, a hydrogen atom, an arenesulfonyl group optionally substituted by an alkyl group, a halogen atom, C_{2-6}alkanoyl amino group or an alkyloxy group, or an alkane-sulfonyl group; aaa is a D-lysine residue or a D-tyrosine residue; B is a side-chain substituent of the amino acid residue for aaa which is selected from the group consisting of an aroyl group and an arylsulfonyl group; Phe is a L-phenylalanine residue; Lys is a L-lysine residue or one partly including D-lysine residue; and C is a hydrogen atom, a secondary amino group, or a methyl group having 1 to 3 hydrogen atoms; a pharmaceutically acceptable acid addition salt thereof, and a pharmaceutically acceptable aldehyde equilibrium derivative thereof in case that C is a hydrogen atom.

4,883,864

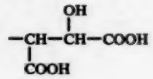
MODIFIED COLLAGEN COMPOUND AND METHOD OF PREPARATION

Matthew T. Scholz, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation-in-part of Ser. No. 104,777, Oct. 5, 1987, Pat. No. 4,851,513, which is a continuation-in-part of Ser. No. 890,847, Aug. 6, 1986, Pat. No. 4,713,446, which is a continuation-in-part of Ser. No. 773,310, Sep. 6, 1985, abandoned. This application Oct. 28, 1988, Ser. No. 264,062
Int. Cl.[4] A61K *31/78;* A61B *17/00*
U.S. Cl. 530—356 21 Claims

1. A chemically-modified collagen compound comprising at least two native collagen molecules coupled at least one lysine epsilon amino group present on each of said collagen molecules by a coupling group, said coupling group comprising at least two moieties selected from the group consisting of carbonyl and sulfonyl groups, wherein non-coupled lysine epsilon amino groups are linked to amine modifying groups selected from groups of the formula

wherein R is a substituted or unsubstituted C_{1-8} aliphatic, C_{5-8} alicyclic, or C_{6-10} aromatic group having 0–5 heteoatoms, and the formula



and its metal salts.

4,883,865

RECOVERY OF PRES2+S ANTIGEN

Dennis J. Kubek, Lansdale, Pa., assignor to Merck & Co. Inc., Rahway, N.J.

Filed Sep. 30, 1987, Ser. No. 102,957
Int. Cl.[4] C07K *3/18, 3/28*
U.S. Cl. 530—415 5 Claims

1. A method of isolating a yeast-produced preS2+S antigen from a liquid phase comprising:

forming the liquid phase into an upper preS2+S antigen-containing hydrophobic phase by addition of PEG, and a lower hydrophilic phase by addition of dextran,

separating the upper liquid phase from the lower liquid phase,

absorbing the antigen in the antigen-containing upper liquid phase on fumed silica,

and desorbing the adsorbed antigen.

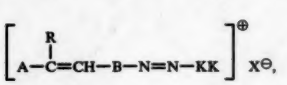
4,883,866

METHINE-AZO COMPOUNDS CONTAINING CYCLIC CATIONIC AMMONIUM GROUPS

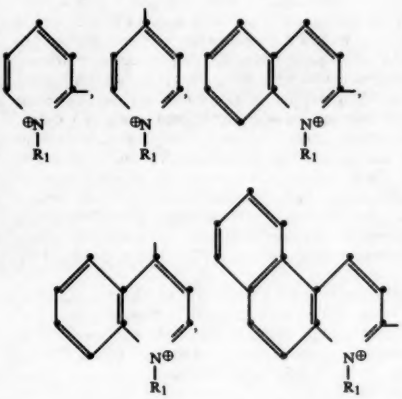
Peter Möckli, Schönenbuch, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 767,910, Aug. 21, 1986, abandoned. This application Feb. 29, 1988, Ser. No. 161,288
Claims priority, application Switzerland, Aug. 22, 1984, 4018/84
Int. Cl.[4] C09B *44/08, 44/10;* D06P *1/41*
U.S. Cl. 534—606 9 Claims

1. A methine-azo compound of the formula

 (I)

in which A is one of the following rings



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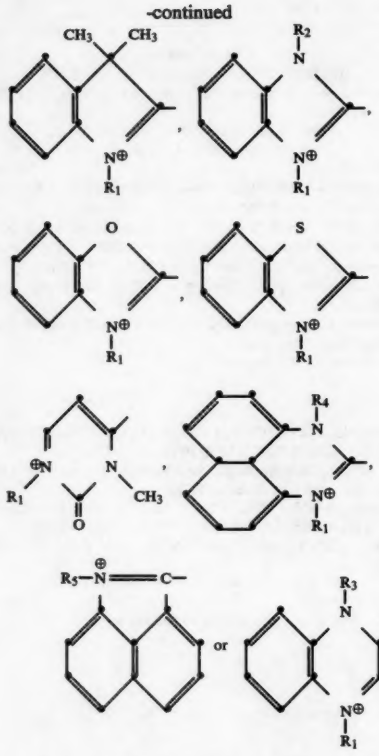


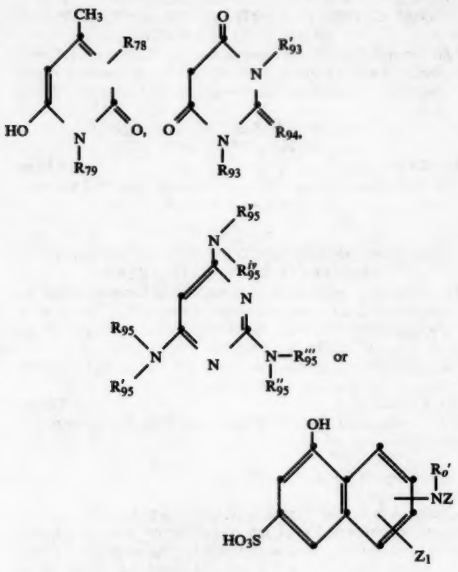
in addition to the substituents R_1–R_5 the rings of A are unsubstituted or are substituted by nitro, halogen, cyano, C_1–C_4-alkyl, C_1–C_4-alkoxy, acetylamino or dimethylamino, and in which R_1, R_2, R_3 and R_4, independently of one another, are C_1–C_8-alkyl, C_2–C_8-alkenyl, or C_3–C_6-cycloalkyl, or are one of these groups in which the alkyl, alkenyl or cycloalkyl chain is interrupted by oxygen or nitrogen atoms, wherein these groups are unsubstituted or are substituted by halogen, cyano, hydroxyl, alkoxy, phenyl, phenoxy, dialkylamino, trialkylammonium, acetylamino, alkylcarbonyl, alkoxycarbonyl, alkylsulfonyl, phenylsulfonyl, benzylsulfonyl, alkylsulfonamido, phenylsulfonamido, benzylsulfonamido, alkylcarbonylamino, benzoyl, benzoylamino, alkylcarbamoyl, phenylcarbamoyl, benzylcarbamoyl, alkylcarbamoyloxy, phenylcarbamoyloxy or benzylcarbamoyloxy, and R_5 is phenyl or is as defined for R_1,

R is hydrogen, cyano or C_2–C_3-alkylene which is bonded to an N atom of ring A to form a 5- or 6-membered ring,

B is unsubstituted phenylene or naphthylene or phenylene or naphthylene which is substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, sulfo or acetylamino,

$X^{\ominus}$ is an anion and

KK is the radical of a coupling component of the formula



in which

R_{78} is CN, $CONH_2$, SO_2NH_2 or C_1–C_4-alkyl,

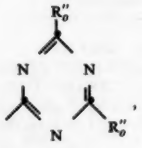
R_{79} is hydrogen or substituted or unsubstituted C_1–C_8-alkyl,

R_{93} and $R_{93}{}^{I}$, independently of one another, are hydrogen or C_1–C_4-alkyl,

R_{94} is O or N—CN and

R_{95}, $R_{95}{}^{I}$, $R_{95}{}^{II}$, $R_{95}{}^{III}$, $R_{95}{}^{IV}$ and $R_{95}{}^{V}$, independently of one another, are hydrogen, C_1–C_4-alkyl, C_2–C_4-alkenyl, cyclopentyl, cyclohexyl, phenyl, benzyl or phenethyl,

Z_1 is hydrogen or sulfo and Z is —CO—alkyl(C_1–C_4)-R_{18} or



$R_o{}^{I}$ is hydrogen or C_1–C_4-alkyl, R_{18} is a basic amino group or a cationic ammonium group, both the $R_o{}^{II}$s independently of each other are OH, NH_2 or an aliphatic, cycloaliphatic or aromatic amine radical.

4,883,867

DETECTION OF RETICULOCYTES, RNA OR DNA

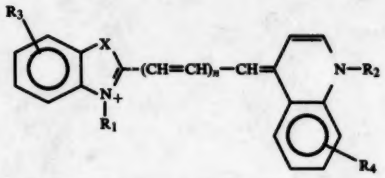
Linda G. Lee, Mountain View, and Chia-Huei Chen, San Jose, both of Calif., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation-in-part of Ser. No. 793,813, Nov. 1, 1985, abandoned. This application Aug. 3, 1987, Ser. No. 81,097

Int. Cl.[4] C07H *15/12, 17/00;* **G01N** *31/00, 33/48*

U.S. Cl. 536—28 **15 Claims**

5. A compound composed of RNA bound to a dye having the formula:



Wherein: X=O,S, Se or C $(CH_3)_2$:
R_1=alkyl having from 1–6 carbons;
R_2=alkyl having from 1–6 carbons;
R_3=fused benzene, alkyl (having 1–6 carbons), methoxy or is hydrogen;
R_4=alkyl having 1–6 carbons, methoxy or hydrogen; and
n=zero or an integer from 1–6.

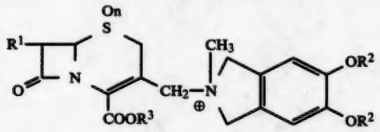
4,883,868

7-AMINO-3-(SUBSTITUTED ISOINDOLINIUM)METHYL-3-CEPHEM DERIVATIVES

Susumu Nakagawa; Ryosuke Ushijima; Fumio Nakano; Koji Yamada, all of Okazaki, and Eiichi Mano, Kariya, all of Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 813,614, Dec. 26, 1985, Pat. No. 4,677,100. This application Jun. 22, 1987, Ser. No. 64,462
Claims priority, application Japan, Dec. 27, 1984, 59-273591; Aug. 6, 1985, 60-171839; Dec. 9, 1986, 61-291431
Int. Cl.[4] C07D *501/46*; A61K *31/545*
U.S. Cl. 540—222 **10 Claims**

1. A compound having the formula:



(I)

wherein R^1 is an amino group or a protected amino group having a protected group selected from the group consisting of benzylidene, phenylacetyl, formyl, tertbutoxycarbonyl and trityl, R^2 is a hydrogen atom or a protecting group for a hydroxyl group selected from the group consisting of acetyl and trimethylsilyl, R^3 represents negative charge, a hydrogen atom or a protecting group for a carboxyl group, and n is 0 or 1, and a salt thereof.

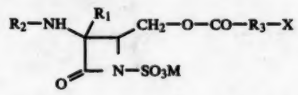
4,883,869

NOVEL BETA-LACTAMS CONTAINING AMINO ACID SUBSTITUENTS

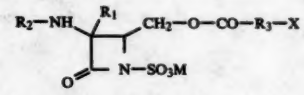
Kyoung S. Kim, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 85,912, Aug. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 789,158, Oct. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 683,975, Dec. 20, 1984, abandoned. This application Sep. 22, 1988, Ser. No. 249,242
Int. Cl.[4] C07D *205/08, 417/14, 417/12*; A61K *31/425*
U.S. Cl. 540—355 **7 Claims**

1. A compound of the formula,



and pharmaceutically acceptable salts thereof; wherein R_1 is hydrogen, —OCH_3, —NH—CHO; wherein R_2 is an acyl group derived from a carboxylic acid; wherein R_3 is selected from the group consisting of —CH—, —CH_2CH_2—, —$CH_2CH_2CH_2$—, and —$CH_2CH_2CH_2CH_2$—, and when X is NL_2L3 then —CH_2CH_2—, —$CH_2CH_2CH_2$—, and —$CH_2CH_2CH_2CH_2$—are optionally substituted with one substituted selected from the group consisting of $(C_1–C_4)$ alkyl, $(C_1–C_4)$carboxyalkyl, or $(C_1–C_4)$ alkylthio;
wherein X is —NL_2L_3 or is pyrrole, except when R_3 is —$CH_2CH_2CH_2CH_2$—, of the formula



wherein L_1 is
a. hydrogen
b. —CO—O—CH_2—(C_6—H_5), or
c. SO_3H;
wherein L_2 is
a. hydrogen, or
b. SO_3H; and
L_3 is
a. hydrogen
b. —CO—(C_1–C_4)alkyl,
c. —CH=NH,
d. —$C(NH_2)$=NH,
e. —CO—O—CH_2—(C_6H_5),
f. —COH, or
g. —SO_3H with the proviso that if one of L_2 or L_3 is —SO_3H then the other is hydrogen.

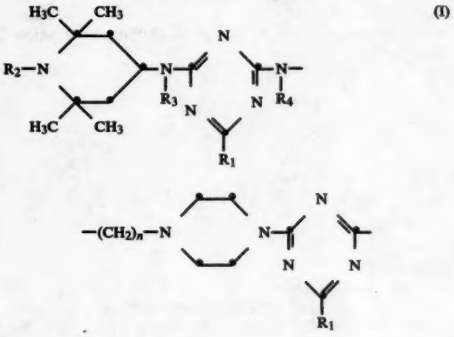
4,883,870

PIPERIDINE-TRIAZINE COMPOUNDS FOR USE AS STABILIZERS FOR ORGANIC MATERIALS

Giuseppe Cantatore, Bitonto; Valerio Borzatta, Bologna, and Franca Masina, Anzola Emilia, all of Italy, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

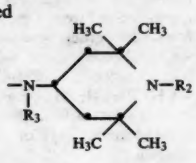
Filed Jul. 11, 1988, Ser. No. 217,262
Claims priority, application Italy, Jul. 16, 1987, 21320 A/87
Int. Cl.[4] C07D *403/00*; C08K *5/35*
U.S. Cl. 540—598 **7 Claims**

1. A compound of the formula (I)

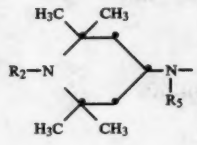


(I)

-continued

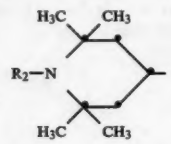


in which R_1 is C_1–C_8-alkyloxy, allyloxy, allylamino, di(C_1–C_4-alkyl)-amino, diallylamino, 1-pyrrolidyl, 1-piperidyl, 4-morpholinyl, 1-hexahydroazepinyl, 4-methyl-1-piperazinyl, or a group of the formula (II),



(II)

R_2 is hydrogen, O·, OH, NO, CH_2CN, C_1–C_8-alkyl, allyl, benzyl, C_1–C_8-acyl, C_1–C_{18}-alkyloxy, C_5–C_{12}-cycloalkyloxy or OH-monosubstituted C_2–C_4-alkyl, R_3 and R_5 independently are hydrogen, C_1–C_{12}-alkyl, C_5–C_{12}-cycloalkyl, C_7–C_9-phenylalkyl, tetrahydrofurfuryl, C_2–C_4-alkyl monosubstituted by OH, by C_1–C_4-alkyloxy or by di(C_1–C_4-alkyl)amino, or a group of the formula (III)



(III)

with R_2 as defined above, R_4 is hydrogen, C_1–C_{12}-alkyl or cyclohexyl and n is an integer from 2 to 6.

4,883,871

PROCESS FOR THE PREPARATION OF 6-ALKYLTHIO-2,4-DIAMINO-1,3,5-TRIAZINES

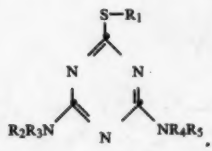
Klaus J. Coers, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 2, 1988, Ser. No. 240,167

Int. Cl.[4] C07D *251/52*

U.S. Cl. 544—210 **20 Claims**

1. A process for the preparation of a 6-alkylthio-2,4-diamino-1,3,5-triazine of formula I

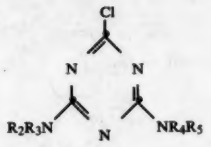


(I)

wherein

R_1 is C_1–C_6alkyl, and

R_2, R_3, R_4 and R_5 are each independently hydrogen, C_1–C_6alkyl, allyl or C_1–C_6alkoxyalkyl, by reacting a 6-chloro-2,4-diamino-1,3,5-triazine of formula II



(II)

wherein R_2, R_3, R_4 and R_5 are as defined above, with a metal thioalkylate of formula III

$$M(SR_1)_n$$

wherein

R_1 is as defined above,

n is 1 or 2, and

M is an alkali metal if n is 1 or an alkaline earth metal if n is 2, which process comprises carrying out the reaction in the presence of a tertiary amine in a two-phase reaction medium consisting of water and an inert, organic, water-immiscible solvent.

4,883,872

3-OXO-1,2,4-TRIAZOLO(4,3-a) PYRIMIDINE-6-CARBOXYLIC ACID ESTERS

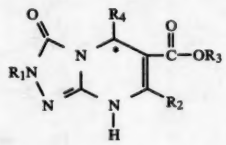
Karnail Atwal, Cranbury, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Nov. 25, 1987, Ser. No. 125,089

Int. Cl.[4] C07D *487/04*; A61K *31/505*

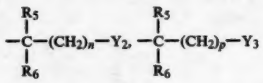
U.S. Cl. 544—263 **6 Claims**

1. Compounds having the formula



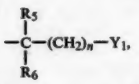
and pharmaceutically acceptable salts thereof, wherein:

R_1 is hydrogen, alkyl, cycloalkyl, aryl,



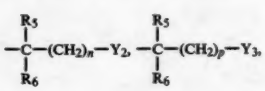
or halo substituted alkyl;

R_2 is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, aryl,



or halo substituted alkyl;

R_3 is hydrogen, alkyl, cycloalkyl, aryl,

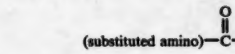


or halo substituted alkyl;

R_4 is aryl;

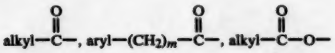
R_5 and R^6 are each independently hydrogen, alkyl, —$(CH_2)_q$—aryl or —$(CH_2)_q$—cycloalkyl;

Y_1 is cycloalkyl, aryl, hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—, amino, substituted amino, carbamoyl,



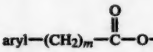
(substituted amino)—C—,

carboxyl, alkoxycarbonyl,



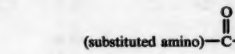
alkyl—C—, aryl—$(CH_2)_m$—C—, alkyl—C—O—

or



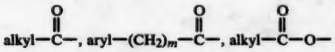
aryl—$(CH_2)_m$—C—O—;

Y_2 is cycloalkyl, aryl, carbamoyl,



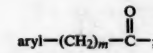
(substituted amino)—C—,

carboxyl, alkoxycarbonyl,



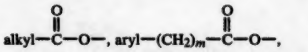
alkyl—C—, aryl—$(CH_2)_m$—C—, alkyl—C—O—

or



aryl—$(CH_2)_m$—C—;

Y_3 is hydroxyl, alkoxy, aryl—$(CH_2)_m$—O—, mercapto, alkylthio, aryl—$(CH_2)_m$—S—,



alkyl—C—O—, aryl—$(CH_2)_m$—C—O—,

amino, or substituted amino;

q is 0, 1, 2 or 3;

m is 0 or an integer of 1 to 6;

n is 0 or an integer of 1 to 5;

p is an integer of 1 to 5;

"alkyl" and "alkoxy" refer to both straight and branched chain groups having 1 to 8 carbon atoms;

"halo substituted alkyl" refers to alkyl groups (as described above) in which one or more hydrogens have been replaced by chloro, bromo or fluoro groups;

"aryl" refers to phenyl and substituted phenyl;

"alkenyl" and "alkynyl" refer to both straight and branched chain groups having 2 to 8 carbon atoms;

"cycloalkyl" refers to groups having 3, 4, 5, 6 or 7 carbon atoms;

"halo" refers to chloro, bromo, fluoro and iodo; and

"substituted amino" refers to a group of the formula —NZ_1Z_2 wherein Z_1 is hydrogen, alkyl, or aryl—$(CH_2)_m$— and Z_2 is alkyl or aryl—$(CH_2)_m$— or Z_1 and Z_2 taken together with the nitrogen atom to which they are attached are 1-pyrrolidinyl, 1-piperidinyl, 1-azepinyl, 4-morpholinyl, 4-thiamorpholinyl, 1-piperazinyl, 4-alkyl-1-piperazinyl, 4-arylalkyl-1-piperazinyl, 4-diarylalkyl-1-piperazinyl, or 1-pyrrolidinyl, 1-piperidinyl, or 1-azepinyl substituted with alkyl, alkoxy, alkylthio, halo, trifluoromethyl or hydroxy; and

"substituted phenyl" refers to phenyl groups substituted with one or more alkyl, alkoxy, alkylthio, halo, nitro, cyano, hydroxy, amino, alkylamino, dialkylamino, trifluoromethyl, isothicyanoto, or difluoromethoxy groups.

4,883,873

METHACRYLOXY-CONTAINING COMPOUNDS

George E. Abboud, Ajax, Canada; Christopher H. Such, Mount Eliza, Australia; Susan M. Horley, Loudwater, and Julian A. Waters, Goring-On-Thames, both of England, assignors to Imperial Chemical Industries PLC, London, England

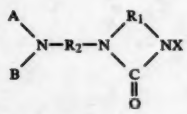
Division of Ser. No. 815,313, Jan. 2, 1986, Pat. No. 4,783,539, which is a continuation of Ser. No. 436,355, Oct. 25, 1982, abandoned. This application Jul. 12, 1988, Ser. No. 217,985

Claims priority, application United Kingdom, Oct. 23, 1981, 8132086; Apr. 30, 1982, 8212639

Int. Cl.[4] C07D *233/36, 239/10*

U.S. Cl. 544—316 **5 Claims**

1. A polymerisable monomer of structure



wherein R_1 and R_2 are the same or different alkylene groups containing 2 or 3 carbon atoms, A is an alkyl group containing 2 to 18 carbon atoms substituted with at least one cyano group, B is a methacryloxyalkyl wherein the alkyl group contains 2 to 18 carbon atoms and is unsubstituted or substituted with a hydroxyl group and X is hydrogen, C_1 to $_{18}$ alkyl or

and wherein A and B are linked to the nitrogen through a carbon atom.

4,883,874

AZABICYCLIC INTERMEDIATES

Francis D. King, Bishop's Stortford; Michael S. Hadley, Sawbridgeworth, and Roger T. Martin, Stevenage, all of England, assignors to Beecham Group plc. of Beecham House, United Kingdom

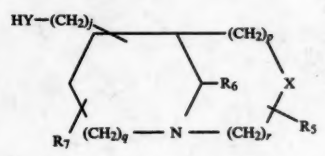
Division of Ser. No. 887,122, Jul. 17, 1986, Pat. No. 4,826,839. This application Feb. 8, 1989, Ser. No. 308,102

Claims priority, application United Kingdom, Jul. 19, 1985, 8518236

Int. Cl.[4] C07D *498/08, 513/03*

U.S. Cl. 544—47 **3 Claims**

1. A compound of formula (V):



(V)

wherein:

j is 0 or 1;

q is 0, 1 or 2;

p is 0 and r is 2;

X is O, S or SO;
Y is NH;
one of R5 and R6 is hydrogen, C_{1-6} alkyl, phenyl or phenyl-C_{1-6} alkyl, which phenyl moieties may be substituted by C_{1-6} alkyl, C_{1-6} alkoxy or halogen; and the other is hydrogen or C_{1-6} alkyl; and
R7 is hydrogen, C_{1-6} alkyl, phenyl or phenyl-C_{1-3} alkyl, which phenyl moieties may be substituted by C_{1-6} alkyl, C_{1-6} alkoxy, CF_3 or halogen.

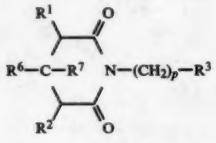
4,883,875

ANTIPSYCHOTIC IMIDES

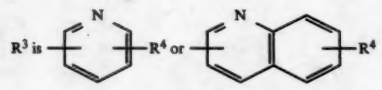
Magid A. Abou-Gharbia, Glen Mills, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 21,952, Mar. 5, 1987, Pat. No. 4,851,533. This application Apr. 7, 1989, Ser. No. 335,172
Int. Cl.[4] C07D *215/00*
U.S. Cl. 546—16 **2 Claims**

1. A compound of the formula:



in which
R^1 and R^2 are hydrogen or alkyl of 1 to 3 carbon atoms;
R^6 and R^7, taken together, are tetramethylene, pentamethylene or hexamethylene;
p is one of the integers 2, 3, 4 or 5;
and



where
R^4 is hydrogen, alkyl of 1 to 6 carbon atoms; alkoxy of 1 to 6 carbon atoms or halo;
or a pharmaceutically acceptable salt thereof.

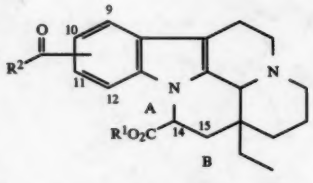
4,883,876

ACYLATED VINCAMINIC ACID DERIVATIVES

Shin-ichi Nakatsuka, Aichi; Masatoshi Hayashi, Saitama; Sadakazu Yokomori, Urawa; Yoshimoto Nakashima, Ageo; Katsuo Hatayama, Omiya, and Hiroaki Araki, Hasuda, all of Japan, assignors to Taisho Pharmaceutical Co., Ltd., Japan

Filed Sep. 2, 1988, Ser. No. 239,687
Claims priority, application Japan, Sep. 7, 1987, 62-223753
Int. Cl.[4] C07D *461/00*; A61K *31/475*
U.S. Cl. 546—51 **2 Claims**

1. Vincaminic acid derivatives represented by the formula



wherein R^1 is a hydrogen atom, an alkyl group having 1 to 8 carbon atoms or an alkoxyalkyl group having 2 to 6 carbon atoms, R^2 is a hydrogen atom, an alkyl group having 1 to 10 carbon atoms, a halogenated alkyl group having 1 to 5 carbon atoms, a cycloalkyl group having 3 to 6 carbon atoms, an alkoxycarbonylalkyl group having 3 to 8 carbon atoms, an alkenyl group having 2 to 4 carbon atoms, a phenyl group, a phenyl group substituted by alkoxy groups each having 1 or 2 carbon atoms or a thienyl group, A is a hydroxyl group, B is a hydrogen atom, or A and B together form a valence bond, and the acid addition salts thereof.

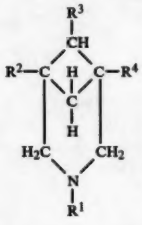
4,883,877

AZABICYCLOHEPTANES AND PROCESS FOR THEIR PREPARATION

Alex Alder, Arisdorf, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 31, 1988, Ser. No. 264,584
Claims priority, application Switzerland, Nov. 13, 1987, 4434/87
Int. Cl.[4] C07D *221/22*
U.S. Cl. 546—112 **11 Claims**

1. A compound of the formula I



(I)

or an ammonium salt thereof, in which R^1 is a hydrogen atom, linear or branched C_1–C_{20}alkyl, C_3–C_8cycloalkyl, C_4–C_{20}alkylcycloalkyl, C_4–C_{12} cycloalkylalkyl, C_5–C_{20}alkylcycloalkylalkyl, C_6–C_{14}aryl, C_7–C_{20}alkaryl or aralkyl or C_8–C_{20}alkaralkyl, which is unsubstituted or substituted by halogen, —OH, —CN, —NO_2, C_1–C_6halogenoalkyl, —COOH, —SO_3H, R^5CO-, R^5COO-, R^5OCO-, R^5OSO_2-, R^5SO_2-, R^5SO_3-, C_1–C_6halogenoalkyl, C_1–C_6alkoxy, C_1–C_6alkylthio, C_6–C_{10} aryloxy or arylthio or C_7–C_{12}aralkyloxy or aralkylthio, in which R^5 is C_1–C_{12}alkyl, C_4–C_7cycloalkyl, C_5–C_{16}alkylcycloalkyl or cycloalkylalkyl, C_6–C_{16}alkylcycloalkylalkyl, C_6–C_{10}aryl, C_7–C_{16}aralkyl or alkaryl or C_8–C_{16}alkaralkyl, R^2 is a hydrogen atom, linear or branched C_1–C_{20}alkyl, alkoxy, alkylthio, C_3–C_8cycloalkyl, C_4–C_{20}alkylcycloalkyl or cycloalkylalkyl, C_5–C_{20}alkylcycloalkylalkyl, C_3–C_8cycloalkyloxy or -thio, C_4–C_{20}alkylcycloalkyloxy or -thio or cycloalkylalkyloxy or -thio, C_5–C_{20}alkylcycloalkylalkyloxy or -thio, C_6–C_{14}aryl, aryloxy or arylthio, C_7–C_{20}alkaryl, alkaryloxy or alkarylthio, C_7–C_{20}aralkyl, C_7–C_{20}aralkyloxy or -thio, C_8–C_{20}alkaralkyl or C_8–C_{20}alkaralkyloxy or -thio, which is unsubstituted or is substituted as defined for R^1, R^4 independently has the same meaning as R^2, with the exception of C_6–C_{14}aryl and C_7–C_{20}alkaryl which is unsubstituted or substituted as defined for R^1, and R^3 independently has the meaning of R^2, or is halogen, carboxyl or carboxylate having 2 to 16 C atoms, with the proviso that R^1, R^2, R^3 and R^4 are not simultaneously H.

4,883,878

PROCESS FOR UNSYMMETRICAL DITHIOACETALS AND DITHIOKETALS

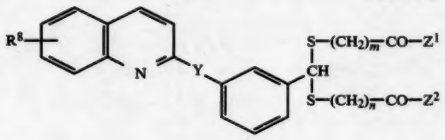
Joseph S. Amato, Brooklyn, N.Y.; James M. McNamara, Rahway, N.J.; Johnnie L. Leazer, Jr., Piscataway, N.J.; Paul J. Reider, Westfield, N.J., and Robert A. Reamer, Bloomfield, N.J., assignors to Merck & Co. Inc., Rahway, N.J.

Filed Feb. 8, 1988, Ser. No. 153,399

Int. Cl.[4] C07D *215/12*

U.S. Cl. 546—172 6 Claims

1. A process for preparing a compound having the formula



wherein

R^8 is:

(a) hydrogen;

(b) C_1–C_6 alkyl;

(c) C_1–C_6 alkoxy; or

(d) halogen;

Y is:

(a) C_2–C_6 alkylene; or

(b) C_2–C_6 alkenylene;

Z^1 is C_1–C_6 alkoxy or $NR^{11}R^{12}$, wherein

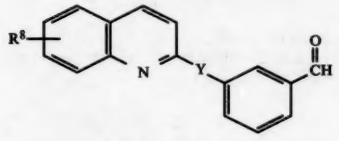
R^{11} and R^{12} are independently hydrogen or C_1–C_6 alkyl;

Z^2 is C_1–C_6 alkyl; and

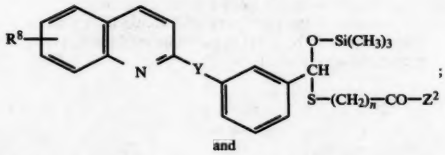
m and n are independently integers of from 1 to 10;

comprising:

(a) allowing one part by moles of a compound of the formula



to react, in a suitable organic solvent, with a mixture of about 0.8 to 1.2 parts by moles of a thiol of the formula $HS—(CH_2)_n—(C=O)—Z^2$ and an excess of hexamethyldisilazane, in the presence of imidazole, to form a trimethylsilylated hemithioacetal intermediate of the formula



and

(b) allowing the trimethylsilylated hemithioacetal intermediate to react, in a suitable organic solvent, with at least about 0.8 to 1.2 parts by moles of thiol of the formula $HS—(CH_2)_m—(C=O)—Z^1$, in the presence of boron trifluoride etherate.

4,883,879

CEPHALOSPORIN COMPOUNDS, PROCESSES FOR THEIR PREPARATION AND ANTIBACTERIAL AGENTS

Yoshiyuki Zama, Nagareyama; Nobuo Ishiyama, Washinomiya; Tsuneo Saita, Tokyo; Takanobu Naito, Funabashi; Masao Hirose, Iwai; Masaaki Yokoyama, Tokyo; Taiji Asano, Fukuoka; Hisato Senda, Tokyo; Keiji Sekine, Omiya, and Shigeru Sanai, Wako, all of Japan, assignors to Kaken Pharmaceutical Co., Ltd., Tokyo, Japan

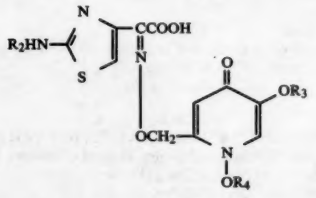
Division of Ser. No. 63,077, Jun. 17, 1987, Pat. No. 4,822,786. This application Jan. 13, 1989, Ser. No. 296,765

Claims priority, application Japan, Jul. 1, 1986, 61-152706; Aug. 18, 1986, 61-191590

Int. Cl.[4] C07D *417/12*

U.S. Cl. 546—280 1 Claim

1. A compound having the formula:



(II)

wherein R_2 is a hydrogen atom or an amino-protecting group selected from the group consisting of tri-lower alkylsilyl, acyl and aralkyl, and each of R_3 and R_4 is a hydrogen atom or a hydroxyl-protecting group selected from the group consisting of tri-lower alkylsilyl, acyl, aralkyl, methoxymethyl, allyl and pyranyl, or a reactive derivative thereof selected from the group consisting of a salt, acid halide, ester, anhydride, amide and azide.

4,883,880

PROCESS FOR THE PREPARATION OF SULFOALKYL QUATERNARY SALTS AND FOR THE PRODUCTION OF ALKANE SULTONES

Helmut Kampfer, Cologne, and Wolfgang Himmelmann, Leverkusen, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

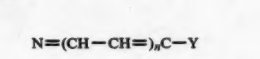
Continuation-in-part of Ser. No. 373,986, May 3, 1982, abandoned, which is a continuation-in-part of Ser. No. 440,201, Nov. 18, 1982, abandoned. This application Aug. 8, 1983, Ser. No. 520,911

Int. Cl.[4] C07D *213/18, 327/04, 327/06, 143/42*

U.S. Cl. 546—347 13 Claims

1. The process for the preparation of sulfoalkyl quaternary salt of a tertiary amine by reacting the tertiary amine with a sulfoalkylating agent at an elevated temperature, wherein

(a) The tertiary amine corresponds to the following general formula II



II

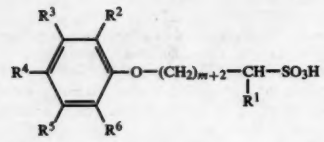
wherein

Y represents hydrogen, halogen, a saturated or unsaturated aliphatic group containing up to 6 carbon atoms; alkoxy, alkylthio or mercapto;

Z represents the members required for completing a heterocyclic group comprising at least one 5- or 6-membered heterocyclic ring; and

n=0 or 1;

(b) the sulfoalkylating agent is a sulfoalkylaryl ether of the following general formula



(I)

wherein

R^1 represents hydrogen or methyl;

R^2, R^3, R^4, R^5, R^6 represent hydrogen, alkyl having 1 or 2 carbon atoms, halogen, OCH_3, cyano or nitro (but not more than 2 nitro groups are present in the phenyl ring); or R^3 together with R^2 or R^4 represent ring members required for completing a condensed 5- or 6-membered ring; and

m=0 or 1; and

(c) the sulfoalkylating reaction is carried out at a temperature in the range of from 100° to 250° C.

4,883,881

PREPARATION OF UV GRADE SYNTHETIC PYRIDINE

David Feitler, New Windsor, and Henry Wetstein, Monroe, both of N.Y., assignors to Nepera, Inc., Harriman, N.Y.

Filed Apr. 27, 1988, Ser. No. 186,825

Int. Cl.[4] C07D *213/02, 213/127*

U.S. Cl. 546—353 **12 Claims**

1. A method of preparing UV-grade synthetic pyridine from a pyridine-containing reaction product mixture which also contains at least one other compound which is UV absorbing to a sufficient extent that said pyridine mixture is not UV grade, said mixture being obtained from the condensation reaction, over an effective catalyst, of one of more aldehydes and/or ketones with one or more amines and/or ammonia,

comprising recovering from said mixture a pyridine-water azeotrope effective to separate pyridine therefrom sufficiently free of UV-absorbing compounds to be UV grade.

4,883,882

PROCESS FOR THE PREPARATION OF COMPOUNDS CONTAINING A TRIAZOLE AND TETRAHYDROFURAN GROUP, AND NEW COMPOUNDS CAPABLE OF BEING EMPLOYED FOR THE PREPARATION OF THE SAID COMPOUNDS

Jean P. Corbet, Ecully, and Jean M. Mas, Villeurbanne, both of France, assignors to Rhone-Poulenc Agrochimie, Lyons, France

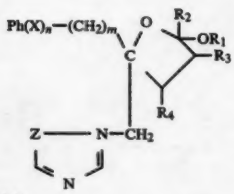
Filed Aug. 24, 1987, Ser. No. 88,257

Claims priority, application France, Aug. 22, 1986, 86 12096

Int. Cl.[4] C07D *249/08*

U.S. Cl. 548—262 **20 Claims**

1. A process for the synthesis of compounds of formula I,



(I)

in which:

R_1 denotes the hydrogen atom or a lower alkyl, lower cycloalkyl, aryl or aralkyl radical, wherein said radical is unsubstituted or substituted by one or more atoms or radicals,

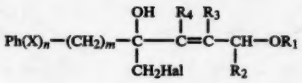
R_2, R_3 and R_4, which are identical or different denote a hydrogen atom or a lower alkyl or lower cycloalkyl radical, wherein said radical is unsubstituted or substituted by one or more atoms or radicals,

X is a halogen atom or an alkyl or alkoxy group containing from 1 to 12 carbon atoms which is unsubstituted or substituted with a mono- or polyhalogenated or a cyano group in the case where one or more of R_3 and R_4 correspond to the hydrogen atom,

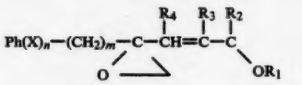
n is zero or a positive integer which is smaller than 6, it being understood that when n is greater than 1, the substituents X may be either identical or different,

m equals 0 or 1, and Z denotes a trivalent group consisting either of a =CH— group or a nitrogen atom =N—, the process comprising:

isomerizing compounds of formula IV or IV*a*

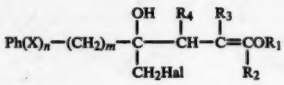


(IV)

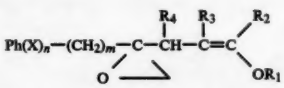


(IVa)

in which Hal corresponds to a halogen atom and X, n, m, and R_1 to R_4 have the same meaning as in the case of formula I, in the presence of a catalyst, in homogeneous or heterogeneous phase, so as to lead to the compounds of formula III or III*a*,



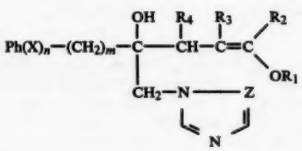
(III)



(IIIa)

this stage being followed:

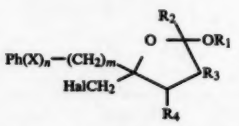
either by grafting an imidazole or triazole ring to produce a compound of formula II



(II)

in which X, n, m, R_1 to R_4 and Z have the same meaning as in formula I, followed by cyclizing the resulting compound in an acidic medium to produce a compound of formula I,

or, in the case of the compound of formula III, cyclizing a compound of formula III in an acidic medium to produce a compound of formula V,



(V)

in which X, m, n and R_1 to R_4 have the same meaning as in formula I, followed by grafting an imidazole or triazole ring in

the presence of an acid scavenger to produce the compound of formula I.

4,883,883

NOVEL N[METH)ALLYLOXY(METH)ALLYLPHENYL]MALEIMIDES AND THERMOSETTING IMIDO COPOLYMERS PREPARED THEREFROM

Pascal Barthelemy, Lyons, and Michel Crochemore, Chaponost, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Dec. 17, 1987, Ser. No. 134,088

Claims priority, application France, Dec. 17, 1986, 86 17916

Int. Cl.[4] C07D *207/28;* C07G *101/44*

U.S. Cl. 548—549 **4 Claims**

1. N-[(meth)allyloxy-(meth)allylphenyl]maleimide.

4,883,884

TETRAHYDRO-5-ISOPROPYL-2-METHYL-2-THIOPHENE ACETONITRILE, ORGANOLEPTIC USES THEREOF AND PROCESS FOR PREPARING SAME

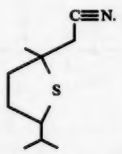
Richard M. Boden, Ocean, and Joseph A. McGhie, South Orange, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Nov. 18, 1988, Ser. No. 273,016

Int. Cl.[4] C07D *333/12;* A23L *2/26*

U.S. Cl. 549—74 **1 Claim**

1. The tetrahydro-5-isopropyl-2-methyl-2-thiophene acetonitrile having the structure:



4,883,885

OXOLABDANES

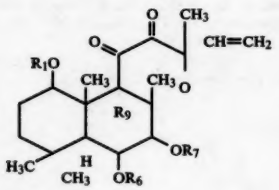
Nicholas J. Hrib, Somerville, N.J., assignor to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Division of Ser. No. 901,337, Aug. 28, 1986, Pat. No. 4,740,522. This application Feb. 8, 1988, Ser. No. 153,631

Int. Cl.[4] C07D *311/92*

U.S. Cl. 549—214 **10 Claims**

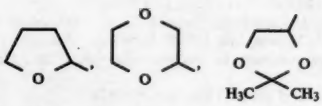
1. A process for the preparation of a compound of the formula



wherein:

(a) R_1 is hydrogen, a group of the formula R_2CO wherein R_2 is hydrogen or loweralkyl of 1 to 6 carbon atoms or a group of the formula $R_3R_4R_5Si$ wherein R_3, R_4 and R_5 are loweralkyl of 1 to 6 carbon atoms;

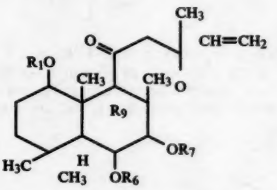
(b) R_6 and R_7 are independently hydrogen, a group of the formula R_8CO wherein R_8 is hydrogen, loweralkyl of 1 to 6 carbon atoms, CH_3CHOH, $HOCH_2CHOH$,



or a group of the formula $R_{10}O(CH_2)_n$ wherein R_{10} is independently hydrogen or loweralkyl of 1 to 6 carbon atoms and n is 2, 3 or 4;

(c) R_9 is a group of the formula OR_{13} wherein R_{13} is hydrogen;

(d) R_6 and R_7 taken together from a group of the formula CO or a group of the formula SO which comprises contacting a compound of the formula



wherein R_1, R_6 and R_7 are as above and R_9 is hydrogen with selenium dioxide.

4,883,886

PROCESS FOR MANUFACTURING POLYALKENYL SUCCINIC ANHYDRIDES

Chente Huang, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Jan. 14, 1988, Ser. No. 143,760

Int. Cl.[4] C07D *307/60*

U.S. Cl. 549—255 **3 Claims**

1. A process in which a polymer of a C_2–C_8 olefin having a number average molecular weight of about 250 to 30,000 undergoes reaction with an unsaturated aliphatic dicarboxylic acid anhydride in two stages in the presence of 5–500 ppm, based on said polymer, of a tar and side product suppressing agent to form an alkenylsubstituted anhydride, said process having a first stage comprising the following steps: (1) charging to a reaction zone said olefin polymer; (2) heating same to a reaction temperature of about 150° C. to about 300° C.; (3) charging about 30 to about 60 weight percent of the total amount of tar and side product suppressing agent intended for use in the reaction; (4) charging said anhydride to the heated reaction zone gradually over a period of about 1 to 3 hours and in an amount in the range of about 50 to about 75 weight percent of the total amount of anhydride intended for the reaction while maintaining said reaction temperature; and (5) allowing the reaction of the anhydride and polymer to proceed at said reaction temperature for a period of about 2 to 7 hours following completion of said anhydride addition; followed by a second stage comprising the steps of: (1) charging the remaining tar and side product suppressing agent to the reaction zone; (2) charging the remaining anhydride to the reaction zone gradually over a 1 to 3 hour period; and (3) allowing the reaction of the anhydride and polymer to proceed to completion.

4,883,887

SULFONE POLYENE INTERMEDIATES

Kurt Bernhard, Lupsingen; Stephan Jäggli, Bubendorf; Paul Kreienbühl, Riehen, and Ulrich Schwieter, Reinach, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

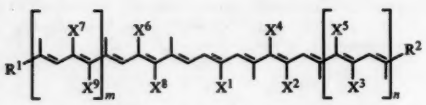
Filed Jul. 1, 1988, Ser. No. 214,567

Claims priority, application Switzerland, Jul. 9, 1987, 2615/87; May 9, 1988, 1749/88

Int. Cl.[4] C07D *317/72*; C07C *147/08*

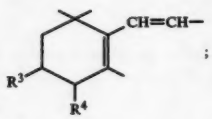
U.S. Cl. 549—341 **22 Claims**

1. Compounds of the general formula



I

wherein m and n are independently 0 or 1, R^1 and R^2 are selected from the group consisting of 4-methyl-3-pentenyl, formyl protected with an acetal protecting group, carboxy, carboxy esterified with an ester protecting group, and a group of the formula:



II

R^3 and R^4 are hydrogen, hydroxy, hydroxy protected with a protecting group, oxo or oxo protected with a protecting group; with the proviso that when m is 1, R^1 is 4-methyl-3-pentenyl; and when m is 0, R^1 is other than 4-methyl-3-pentenyl; and when n is 1, R^2 is 4-methyl-3-pentenyl and when n is 0, R^2 is other than 4-methyl-3-pentenyl; only one of X^1, X^2, X^3, X^4 and X^5 being a sulfonyl residue while the others are hydrogen; and X^6, X^7, X^8 and X^9 all being hydrogen except in the case where R^1 and R^2 are both selected from the same group and X^1 is hydrogen, then in this case, X^6 can be either hydrogen or a sulfonyl residue if X^2 is a sulfonyl residue, X^7 can be either hydrogen or a sulfonyl residue if X^3 is a sulfonyl residue, X^8 can be either hydrogen or a sulfonyl residue, if X^4 is a sulfonyl residue, and X^9 can be either hydrogen or a sulfonyl residue if X^5 is a sulfonyl residue.

4,883,888

OXA-FENCHYL AMINES USEFUL FOR PREPARING HIGH INTENSITY SWEETENERS

John M. Gardlik, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jul. 13, 1984, Ser. No. 630,464

Int. Cl.[4] C07D *307/00*

U.S. Cl. 549—463 **2 Claims**

1. endo-2-Amino-1,3,3-trimethyl-7-oxabicyclo[2.2.1]-heptane.

4,883,889

ALKYLENE OXIDES PRODUCTION USING MOLTEN NITRATE SALT CATALYST AND A CO-CATALYST

B. Timothy Pennington, Sulphur, La., assignor to Olin Corporation, Cheshire, Conn.

Continuation-in-part of Ser. No. 929,552, Nov. 12, 1986, Pat. No. 4,785,123. This application Apr. 18, 1988, Ser. No. 182,617

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.[4] C07 *301/06*

U.S. Cl. 549—532 **17 Claims**

1. A process for producing an alkylene oxide or mixture of alkylene oxides by a reaction which comprises reacting an olefin having from 3 to 22 carbon atoms per molecule, or mixture thereof, with an oxygen-containing gas, said olefin and said oxygen-containing gas being gaseous reactants, by contacting said gaseous reactants with a bath, stream, spray or mist of at least one molten nitrate salt catalyst and a co-catalyst, said catalyst being present in an amount sufficient to absorb any heat generated during said reaction while maintaining an essentially constant reaction temperature, said co-catalyst being an elemental metal, or oxide or hydroxide thereof, which is suspended, dispersed or dissolved in said catalyst, said reaction being conducted at a reaction temperature of between about 135° C. and about 600° C. and a reaction pressure of between about 1 and about 50 atmospheres.

4,883,890

UNSYMMETRICAL ORGANIC DISULFIDE COMPOUNDS USEFUL AS ANTIRADIATION AGENTS

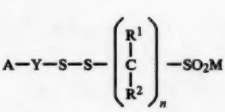
Lamar Field, Nashville, Tenn.; Hikmat A. Musallam, Damascus, Md.; Jeffrey D. Macke, Ft. Mitchell, Ky., and Pramod K. Srivastava, Varanasi, India, assignors to Vanderbilt University, Nashville, Tenn.

Division of Ser. No. 907,882, Sep. 16, 1986. This application Aug. 3, 1988, Ser. No. 228,010

Int. Cl.[4] C07C *145/00*

U.S. Cl. 558—61 **4 Claims**

1. A compound of the formula



wherein A is COOH, Y is a straight chain alkyl having from two to eight carbon atoms which may have an S-S group interposed therebetween, R^1 and R^2 are hydrogen or cycloalkyl, n is an integer from two through five, M is hydrogen, alkali metal or a straight chain alkyl having up to four carbon atoms.

4,883,891

PHOSPHATE AND PHOSPHONATE COMPOUNDS

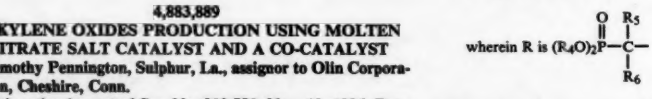
Thomas A. Hardy, Thousand Oaks, Calif., and Edward N. Walsh, New City, N.Y., assignors to Akzo America Inc., New York, N.Y.

Division of Ser. No. 20,829, Mar. 2, 1987, Pat. No. 4,808,744, which is a continuation of Ser. No. 737,128, May 23, 1985, abandoned. This application Oct. 17, 1988, Ser. No. 258,536

Int. Cl.[4] C07F *9/40*

U.S. Cl. 558—161 **6 Claims**

1. A compound of the formula:



$(RO)_n(R_1O)_{2-n}P(O)Z$

wherein R is $(R_4O)_2P(O)C(R_5)(R_6)$

R_1 and R_4 are the same or different and are alkyl, aryl or haloaryl,

R_5 and R_6 are the same or different and are hydrogen, alkyl, haloalkyl, aryl, or haloaryl,

n is 1 or 2, and

Z is hydrogen.

4,883,892

PHOSPHATE AND PHOSPHONATE COMPOUNDS

Thomas A. Hardy, Thousand Oaks, Calif., and Edward N. Walsh, New City, N.Y., assignors to Akzo America Inc., New York, N.Y.

Division of Ser. No. 20,829, Mar. 2, 1987, Pat. No. 4,808,744, Continuation-in-part of Ser. No. 737,128, May 23, 1985, abandoned. This application Oct. 20, 1988, Ser. No. 260,342
Int. Cl.[4] C07F 9/09
U.S. Cl. 558—164 4 Claims

1. A compound of the formula:

$$(RO)_n(R_1O)_{2-n}P(O)Z$$

wherein $R = (R_2O)_2\overset{O}{\overset{\|}{P}}(OR_3)_x$

R_1 and R_2 are the same or different and are alkyl, aryl or haloaryl,
R_3 is alkylene or haloalkylene,
n is 1 or 2,
x is an integer from 1 to 10, and
Z is hydrogen.

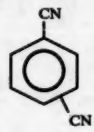
4,883,893

PROCESS FOR THE CONTINUOUS PRODUCTION OF PHTALODINITRILE

Enrico Pontoglio, Brescia; Sandro Parodi, Nuvolento, and Giancarlo Caretti, Brescia, all of Italy, assignors to Caffaro s.p.a. Societa per l'Industria Chimica Ed Elettro Chimica, Milan, Italy

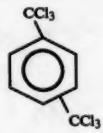
Filed May 19, 1987, Ser. No. 52,028
Claims priority, application Italy, Jun. 24, 1986, 20884 A/86
Int. Cl.[4] C07C 120/04
U.S. Cl. 558—308 8 Claims

1. Process for the preparation of compounds of formula (I)



(I)

by reacting a compound of formula (II)



(II)

with ammonia vapours in the presence of a dehydration catalyst, wherein:

(a) the compounds of formula (II) are reacted in the form of vapours;
(b) the reaction is effected in the absence of solvent; and
(c) the catalyst is in the form of a fixed bed, wherein the temperatures ranges from 300° to 450° C.

4,883,894

PROCESS FOR THE PRODUCTION IN CONTINUOUS OF PHTHALODINITRILE

Enrico Pontoglio, Brescia; Sandro Parodi, Nuvolento, and Giancarlo Caretti, Brescia, all of Italy, assignors to Caffaro s.p.a. Societa per l'Industria Chimica ed Elettrochimica, Milan, Italy

Filed Mar. 24, 1987, Ser. No. 29,717
Claims priority, application Italy, Apr. 14, 1986, 20077 A/86
Int. Cl.[4] C07C 120/00
U.S. Cl. 558—311 7 Claims

1. Process for the preparation of a compound of formula (I) by reacting a compound of formula (II) with ammonia vapours in the presence of a dehydration catalyst, wherein the improvement is that

(a) the compounds of formula (II) are reacted in the form of vapours;
(b) the reaction is effected in the absence of solvent;
(c) the catalyst is in the form of a fixed bed, the temperature of which ranges from 250 to 450° C.

4,883,895

AMMOXIDATION OF PARAFFINS AND CATALYSTS THEREFOR

James F. Brazdil, Jr., Mayfield Village; Linda C. Glaeser, Lyndhurst, and Mark A. Toft, Lakewood, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 250,654, Sep. 29, 1988. This application May 8, 1989, Ser. No. 348,438
The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.
Int. Cl.[4] C07C 120/14
U.S. Cl. 558—319 4 Claims

1. A process for making an α,β-unsaturated mononitrile by the catalytic reaction in the vapor phase of a paraffin selected from propane and isobutane with molecular oxygen and ammonia and optionally a gaseous diluent, by catalytic contact of the foregoing reactant in a reaction zone with an intimate particulate mixture of a first catalyst composition and a second catalyst composition, said feed to the reaction zone containing a mole ratio of said paraffin:NH_3 in the range from 2 to 16 and a mole ratio of said paraffin to O_2 in the range from 1 to 10, said first catalyst composition being 0–99 weight percent of a diluent/support and 100-1 weight percent of a catalyst having the components in the proportions indicated by the empirical formula:

$$VP_pW_wA_aD_dC_cT_tO_x \text{ (formula)}$$

where
A is one or more of Sn, Mo, B and Ge;
D is one or more of Fe, Co, Ni, Cr, Pb, Mn, Zn, Se, Te, Ga, Zr, In and As;
C is one or more of an alkali metal and Tl;
T is one or more of Ca, Sr, Mg and Ba; and
where a is 0–10;
d is 0–10;
c is 0–1;
t is 0–10;
p is 0.1–20;
w is 0.2–10;
the ratio $(a+c+d+t+w):(1+p)$ is no more than 6; x is determined by the oxidation state of the other elements present; and no more than 2 atoms of Mo are present per atom of V; said second catalyst composition being 0–99 weight percent of a diluent/support and 100-1 weight percent of a catalyst having the components in the proportions indicated by the empirical formula:

$$Bi_iFe_jMo_{12}H_hE_eF_fG_gO_z \text{ (formula 2)}$$

where
H is one or more of an alkali metal, Sm, Ag

E is one or more of Mn, Cr, Cu, V, Zn, Cd, La,
F is one or more of P, As, Sb, Te, W, B, Sn, Pb, Se
G is one or more of Co, Ni, alkaline earth metal and
K is 0.1–12,
l is 0.01–12,
h is 0–0.5,
e is 0.10,
f is 0–10,
g is 0–12,
$k+l+h+e+f+g \leqq 24$, and
x is a number determined by the valence requirements of the other elements present, wherein the weight ratio in said mixture of said first catalyst composition to said second catalyst composition is in the range of 0.001 to 2.5.

4,883,896

METHOD FOR AMMOXIDATION OF PARAFFINS AND CATALYST SYSTEM THEREFOR

Linda C. Glaeser, Lyndhurst; James F. Brazdil, Jr., Mayfield Village, and Mark A. Toft, Lakewood, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Division of Ser. No. 194,665, May 16, 1988. This application Nov. 14, 1988, Ser. No. 270,988
Int. Cl.[4] C07C *120/14*
U.S. Cl. 558—319 **10 Claims**

1. A process for the ammoxidation of a C_3 to C_5 paraffin to an α,β-unsaturated mononitrile which comprises contacting in a reaction zone said paraffin in the vapor phase in admixture with ammonia, molecular oxygen, and optionally an inert gaseous diluent, with an intimate particulate mixture of a first catalyst composition and a second catalyst composition, said feed to the reaction zone containing a mole ratio of paraffin:NH_3 in the range from 2 to 16, and a mole ratio of paraffin:O_2 in the range from 1 to 10 said first catalyst composition being 0–99 weight percent of a diluent/support and 100–1 weight percent of a catalyst having oxygen and the cation components in the proportions indicated by the empirical formula:

$$Bi_aV_bL_lM_mT_tO_x, \qquad \text{formula (1)}$$

wherein
L is one or more of K, Cs, Rb and Tl;
M is one or more of Mo, W, Cr, Ge, Sb, Sn, P, Pb and B;
T is one or more of Zn, Nb, Ta, Fe, Co, Ni Cu, Mn, Ti and rare earths,
a=1–25
b=1–50
l=0–1
m=0.1–20
t=0–20
x is determined by the oxidation state of the other elements in the catalyst,
(a+b):(l+m+t)=20:1 to 1:5
a:b=1:5–5:1 with the proviso that the atomic ratio of Mo:V is zero to <10; said second catalyst composition being 0–99 weight percent of a diluent/support and 100–1 weight percent of a catalyst having oxygen and the cation components in the proportions indicated by the empirical formula:

$$Bi_kFe_lMo_{12}V_vD_dE_eF_fG_gO_z \qquad \text{formula (2)}$$

where
D is one or more of an alkali or alkaline earth metal, Sm, Ag
E is one or more of Mn, Cr, Cu, Zn, Cd, La,
F is one or more of P, As, Sb, Te, W, B, Sn, Pb, Se
G is one or more of Co, Ni
and k is 0.1–12, l is 0.01–12, v is 0–0.5, d is 0–0.5, e is 0–10, f is 0–10, g is 0–12, $v+k+l+d+e+f+g \leqq 24$, and x is a number determined by the valence requirements of the other elements present, wherein the weight ratio in said mixture of said first catalyst composition to said second catalyst composition is in the range of 0.001 to 2.5.

4,883,897

PROCESS FOR PRODUCING 2,6-DICHLOROBENZONITRILE

Yutaka Kiyomiya, Fujisawa; Yasumasa Yamaguchi; Masahiro Ushigome, both of Yokohama, and Hiroshi Murata, Tokyo, all of Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Dec. 21, 1987, Ser. No. 135,353
Claims priority, application Japan, Dec. 19, 1986, 61-303363; Dec. 19, 1986, 61-303364
Int. Cl.[4] C07C *120/14, 120/00, 121/52*
U.S. Cl. 558—327 **2 Claims**

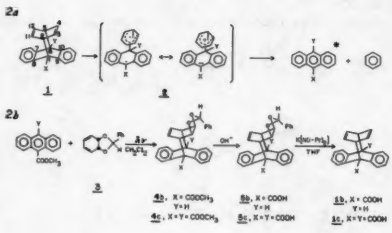
1. A process for producing 2,6-dichlorobenzonitrile comprises contacting a starting gas consisting of 2,6-dichlorotoluene, air and ammonia with a fluidized bed a metallic oxide ammoxidation catalyst is carried on a carrier under the following conditions:
(a) the concentration of 2,6-dichlorotoluene in the starting gas is 2.6 mole % or more,
(b) the reactor effluent gas is contacted with water to cool to a temperature in the range of 50° to 90° C., whereby 2,6-dichlorobenzonitrile in the reaction product gas is collected as a slurry in which solidified 2,6-dichlorobenzonitrile is dispersed in water, and 2,6-dichlorobenzonitrile is obtained from the slurry, and
(c) the cooled reactor effluent gas from which 2,6-dichlorobenzonitrile has been removed is contacted with water again to cool to a temperature in the range of 0° to 40° C., whereby unreacted 2,6-dichlorotoluene in the gas is collected as a dispersion in which it is dispersed in water and 2,6-dichlorotoluene is recovered from the dispersion.

4,883,898

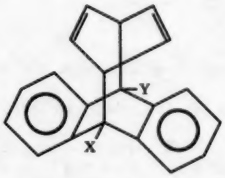
CHEMILUMINESCENT COMPOUNDS

Nien-chu C. Yang, Chicago, Ill., assignor to University of Chicago, Chicago, Ill.

Filed Dec. 10, 1987, Ser. No. 131,113
Int. Cl.[4] C07C *69/76, 63/33;* C09K *11/00*
U.S. Cl. 558—427 **13 Claims**



1. A composition of matter comprising compounds of the following structure:



wherein X is hydrogen or an electron-withdrawing group; and Y is hydrogen or an electron-withdrawing group; and no more than one of X and Y are hydrogen.

4,883,899

END CARBOXYL BEARING REACTIVE VINYL MONOMERS AND PREPARATION THEREOF

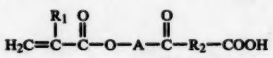
Hisaichi Muramoto, Osaka; Keizou Ishii, Ashiya, and Tadafumi Miyazono, Takatsuki, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 1,011, Jan. 7, 1987. This application Apr. 28, 1989, Ser. No. 345,005

Int. Cl.[4] C07C *143/525, 69/75, 69/80, 67/08*

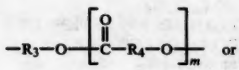
U.S. Cl. 560—14 **4 Claims**

1. An end carboxyl bearing reactive vinyl monomer represented by the formula;



(I)

wherein R_1 is hydrogen or methyl group; R_2 is a bivalent aliphatic hydrocarbon having 2 to 10 carbon atoms, a bivalent alicyclic hydrocarbon having 6 to 7 carbon atoms, phenylene or phenylene substituted with halogen, sulfo or carboxyl group; A is a repeating unit of the formula:



or

R_3 is ethylene or propylene; R_4 is an alkylene having 2 to 7 carbon atoms; R_5 is an alkylene having 2 to 5 carbon atoms; m is an integer of 1 to 10 and n is an integer of 2 to 50.

4,883,900

PROCESS FOR THE PREPARATION OF ASPARTAME AND AGENTS FOR CARRYING IT OUT

Reinhold Keller, Bad Soden am Taunus; Merten Schlingmann, Königstein/Taunus, and Martin Platen, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

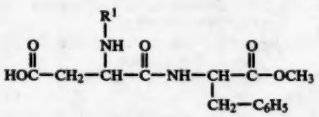
Continuation of Ser. No. 903,751, Sep. 5, 1986. This application Jul. 12, 1988, Ser. No. 219,859

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1985, 3532027

Int. Cl.[4] C07C *103/52*

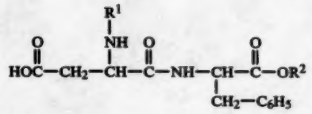
U.S. Cl. 560—41 **10 Claims**

1. A process for the preparation of an optically active form of the compound of the formula III



III

in which R_1 is an amino-protecting group, without a racemization occurring; on the two chiral carbon atoms under the reaction conditions, which process comprises dissolving the optically active compound of the formula II



II

in which

R^1 is an amino-protecting group and

R^2 is an alkyl group having 3–7 carbon atoms, in anhydrous methanol, and transesterifying said compound at a temperature of −20° to 50° C. with the addition of an alkali metal alcoholate.

4,883,901

SYNTHESIS OF 2-(4-AMINOPHENOXY)ALKANOIC ACIDS AND ESTERS AND THEIR DERIVATIVES

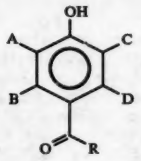
Varadaraj Elongo, Corpus Christi, Tex., assignor to Hoechst Celanese Corporation, Sommerville, N.J.

Filed Mar. 21, 1988, Ser. No. 170,712

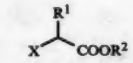
Int. Cl.[4] C07C *101/72*

U.S. Cl. 560—45 **36 Claims**

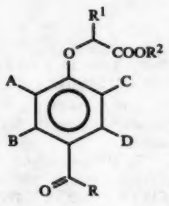
1. A method for synthesizing 2-(4-amidophenoxy)alkanoic acids or esters which comprises reacting a hydroxyaromatic ketone or benzaldehyde derivative of the formula



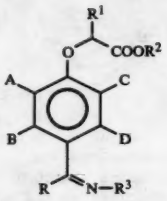
or a salt thereof; with a substituted acid or ester of the formula



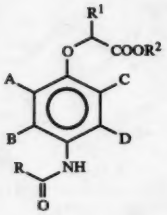
under basic conditions to thereby form a 2-(4-acylphenoxy)alkanoic acid or ester derivative of the formula



and then reacting this intermediate with $H_2N—R_3$ to form a 2-(4-acyliminophenoxy)alkanoic acid or ester of the formula



which is then subjected to a Beckmann Rearrangement in the presence of a catalyst to obtain a 2-(4-amidophenoxy)alkanoic acid or ester of the formula



wherein R, R^1, R^2 and R^4 are independently H, C_1 to C_{18} alkyl or C_6 to C_{10} aryl; and R^3 is OH, O—SO_3H; and A, B, C and D are independently H, X, CF_3, NO_2, CN, C_1 to C_4 alkyl or alkoxy, or C_6 to C_{10} aryl; and X is F, Cl, Br, I or a sulfonic ester.

4,883,902

METHOD OF PRODUCING TETRAKIS[3-(3,5-DI-TERT-BUTYL-4-HYDROXYPHENYL)PROPIONYLOXYMETHYL]METHANE

Masayoshi Gohbayashi, Nakatsu; Noritsugu Narita, Suzuka, and Makoto Maruno, Mie, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

PCT No. PCT/JP88/00088, § 371 Date Sep. 28, 1988, § 102(e) Date Sep. 28, 1988, PCT Pub. No. WO88/05773, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 1, 1988, Ser. No. 275,175

Claims priority, application Japan, Feb. 3, 1987, 62-24163

Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—75 **1 Claim**

1. A method of producing tetrakis[3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionyloxymethyl]methane by ester exchange between a 3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionic acid alkyl ester and pentaerythritol in the presence of a basic catalyst, which comprises carrying out the reaction in the presence of bis[2,2,2-tris(hydroxymethyl)ethoxy]methane.

4,883,903

NOVEL PROCEDURE FOR THE PREPARATION OF ACTIVATED NITROSOCARBAMATES

Pierre Roger, Montigny-les-Bretonneux; Jean-Paul Fournier, and Rolande Leroy, both of Paris, all of France, assignors to Sanofi, Paris, France

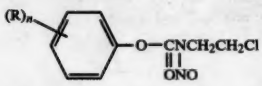
Filed Apr. 22, 1988, Ser. No. 184,915

Claims priority, application France, Apr. 22, 1987, 87 05708

Int. Cl.[4] C07C *125/067, 69/96*

U.S. Cl. 560—137 **5 Claims**

1. Process for preparing a nitrosocarbamate of the formula:

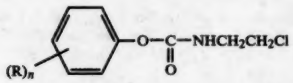


wherein:

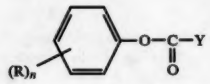
n is an integer of 2 to 5; and

R is Cl, Br or F;

comprising the step of reacting nitrosylsulfuric acid with a carbamate of the formula:



2. The process of claim 1, wherein the carbamate is obtained by reacting $NH_2CH_2CH_2Cl$ with a halogenoformate of the formula:



wherein Y is a halogen.

4,883,904

PROCESS FOR THE PREPARATION OF ETHYLTRIFLUOROACETOACETATE

Louis Amiet, and BErnard Langlois, both of Lyons, France, assignors to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed Jun. 12, 1986, Ser. No. 873,509

Claims priority, application France, Jun. 14, 1985, 85 09023

Int. Cl.[4] C07C *67/313, 69/716, 67/343*

U.S. Cl. 560—174 **10 Claims**

1. A process for the preparation of ethyltrifluoroacetoacetate comprising the steps of:

(a) condensing ethyltrifluoroacetate and ethyl acetate in the presence of sodium ethoxide in an anhydrous medium in cyclohexane;

(b) neutralizing the condensation product in an anhydrous medium with a protonic acid to release an enol; and

(c) separating by distillation the ethyltrifluoroacetoacetate obtained.

4,883,905

PROCESS FOR PREPARING CITRATES USING ORGANIC TITANATES

Ezekiel H. Hull, Greensboro, and Edward P. Frappier, Kernersville, both of N.C., assignors to Morflex Chemical Company, Inc., Greensboro, N.C.

Continuation of Ser. No. 866,463, May 22, 1986, Pat. No. 4,710,532, which is a continuation of Ser. No. 711,284, Mar. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 619,583, Jun. 11, 1984, abandoned. This application Sep. 17, 1987, Ser. No. 97,801

The portion of the term of this patent subsequent to Dec. 8, 2004, has been disclaimed.

Int. Cl.[4] C07C *67/313*

U.S. Cl. 560—180 **6 Claims**

1. A method of producing acetyltri-n-hexyl citrate comprising the steps of: heating n-hexyl alcohol and citric acid in the presence of an organic titanate at a temperature of approximately 140° C. to effect esterification, removing the excess n-hexyl alcohol and acetylating the ester by adding acetic anhydride and sulfuric acid while maintaining the temperature

below approximately 110° C. until the acetylation reaction is complete.

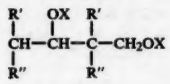
4,883,906

PRODUCTION OF TRISUBSTITUTED HYDROXYALKYL ALKANOATES FROM ALDEHYDES

John N. Argyropoulos, Dunbar; Edmond J. Derderian; Brian T. Keen, both of Charleston, and Timothy G. Bumgardner, Liberty, all of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

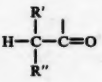
Filed Nov. 25, 1987, Ser. No. 125,139
Int. Cl.[4] C07C *69/28*
U.S. Cl. 560—238 26 Claims

1. In a process for producing and recovering a trisubstituted glycol monoester of the formula:



(I)

wherein X is a hydrogen atom or a



group with the proviso that at any one time only one X group is a hydrogen atom and R′ and R″ individually are hydrocarbyl groups containing from 1 to about 10 carbon atoms, by the condensation at elevated temperature of a C_4 to C_{12} aldehyde in contact with a strong base catalyst and recovering the trisubstituted glycol monoester produced, the improvement in the recovering step comprising flowing the reaction product mixture directly and immediately to an initial distillation of the reaction product mixture before said mixture essentially cools or comes into contact with added aqueous medium, whereby untreated aldehyde and any water present are removed overhead and crude concentrated reaction product mixture bottoms comprising trisubstituted glycol monoester are recovered as a bottoms stream and said concentrated crude bottoms stream is subsequently further refined.

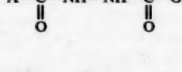
4,883,907

CARBAZATES

Ildiko Ratz nee Simonek; Pal Benko; Edit Berenyi nee Foldermann, and Karoly Magyar, all of Budapest, Hungary, assignors to Egis Gyogyszergyar, Budapest, Hungary

Continuation-in-part of Ser. No. 808,352, Dec. 11, 1985, Pat. No. 4,824,670. This application Apr. 11, 1988, Ser. No. 179,595
Claims priority, application Hungary, Dec. 12, 1984, 4616784
Int. Cl.[4] C07C *125/063*
U.S. Cl. 560—24 5 Claims

1. A carbazate of the Formula (I)



(I)

wherein

A is C_3 to C_{10} alkenyl, C_2 to C_{10} haloalkyl, trifluoromethyl, phenyl-C_1 to C_3 alkyl, phenyl-C_2 to C_3 alkenyl, naphthyl-C_1 to C_3 alkyl, C_3 to C_7 cycloalkyl-C_1 to C_3 alkyl, furyl which can be nitro-substituted, diphenyl-hydroxymethyl or indazolyl which can be substituted by one or more C_1 to C_4 alkoxy groups; and

R is C_1 to C_4 alkyl;

or an agriculturally acceptable acid addition salt thereof.

4,883,908

PROCESS FOR THE PREPARATION OF AROMATIC ISOCYANATES FROM DIALKYL UREAS USING AN ORGANIC SULFONIC ACID PROMOTER

Edward T. Shawl, Wallingford; Haven S. Kesling, Jr., Drexel Hill, and Frank J. Liotta, Jr., Collegeville, all of Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Feb. 2, 1989, Ser. No. 305,356
Int. Cl.[4] C07C *69/00*
U.S. Cl. 560—344 16 Claims

1. A process for the preparation of an aromatic mono- or poly- isocyanate having the formula

$$Ar(NCO)_n$$

wherein Ar is a mono-, di- or poly-valent aromatic radical which may be substituted with a halogen, ether, or nitro group or an alkyl group having from 1 to 10 carbon atoms and n is an integer of from 1 to 3 which comprises heating at a temperature within the range of from about 50° C. to about 220° C. an aromatic bis dialkyl urea having the formula

$$Ar(NHCONR'R'')_n$$

wherein Ar is as above described and R′ and R″ which may be the same or different, are an alkyl group having from 1 to 10 carbon atoms which may be substituted or unsubstituted mono-, di-, or tri-valent radicals selected from saturated or monoolefinic unsaturated straight or branched chain aliphatic or cycloaliphatic radicals and n is an integer of from 1 to 3, dissolved in or slurried in an organic solvent or mixture of solvents and in the presence of an organic sulfonic acid or sulfonated aromatic ion exchange resin as a promoter to convert the urea to the corresponding isocyanate, and thereafter separating and recovering the isocyanate.

4,883,909

LIQUID DIPHENYLMETANE DIISOCYANATE COMPOSITIONS

William E. Slack, Moundsville, W. Va., assignor to Mobay Corporation, Pittsburgh, Pa.

Filed May 11, 1988, Ser. No. 193,302
Int. Cl.[4] C07C *119/48*
U.S. Cl. 560—351 7 Claims

1. A liquid, modified isocyanate prepared by reacting:

(i) 4,4′-diphenylmethane diisocyanate,

(ii) an organic material containing two or more primary and/or secondary aming groups, said organic material forming a product solid at 25° C. when reacted with 4,4′-diphenylmethane diisocyanate in an amount such that the resultant solid product would have an isocyanate group content of from 10 to 30% by weight, and

(iii) from 1 to 6% by weight, based on the combined weight of (i), (ii), and (iii) of tripropylene glycol; said modified isocyanate having an isocyanate group content of from about 10 to about 27% by weight.

4,883,910

OXIDATION OF ORGANICS BY A VANADIUM CONTAINING HETEROPOLYANION COMPOUND

William C. Seidel, Hockessin, Del., assignor to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Mar. 20, 1985, Ser. No. 714,196
Int. Cl.[4] C07C *51/245*
U.S. Cl. 562—528 17 Claims

1. A process for liquid phase oxidation of (1) a cyclic aliphatic compound selected from the group consisting of olefins, alcohols and ketones, said cyclic aliphatic compound having at least 6 carbon atoms or (2) a 2,3- or 3,4-benzo-cycloaliphatic compound in which the cycloaliphatic moiety is an alcohol or ketone of 6 to 12 carbon atoms; said process comprising contacting in aqueous media in the absence of molecular oxygen at

a temperature of from about 60° to 150° C. the cyclic aliphatic compound or the benzocycloaliphatic compound and at least one vanadium containing heteropolyanion compound having the formula $A_mXY_{12-n}V_n^{+5}O_{40}$ wherein

A is H, Li, K or Na;

X is p^{+5}, As^{+5}, Si^{+4}, Ge^{+4} or B^{+3};

Y is Mo or W;

n is an integer from 1 to 10; and

m is 3+n where X is P^{+5} or As^{+5}, 4+n where X is Si^{+4} or Ge^{+4} and 5+n where X is B^{+3}.

4,883,911

PROCESS FOR THE PREPARATION OF ALKYLTHIOALKANOATE SALTS

Dennis A. Ruest, Manchester, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 860,949, May 8, 1986. This application Oct. 6, 1988, Ser. No. 254,537

Int. Cl.[4] C01C *147/02*

U.S. Cl. 562—581 **16 Claims**

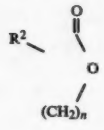
1. A process for the preparation of a compound correspond to the formula:

$$R^1—S—(CH_2)_n—(CH(R^2)—C(O)—OM$$

where R^1 is a lower alkyl group, M is alkali metal, n is an integer between 2 and 4 inclusive, and R^2 is selected from the group consisting of hydrogen, hydroxyl, amino —OR^3 and —NH—R^4 where R^3 is selected from the group consisting of alkyl and aryl, and R^4 is selected from the group consisting of alkyl, aryl, and acyl, the process comprising reacting an alkali metal and mercaptide corresponding to the formula:

$$R^1—S—M$$

where R^1 and M are as defined above, in the presence of an aprotic polar organic solvent, with a lactone corresponding to the formula:



where R^2 and n are as defined above, said aprotic organic solvent having a dipole moment greater than 1 and a dielectric constant greater than about 10.

4,883,912

PROCESS FOR THE RECOVERY OF ACETIC ACID

Kunio Koga; Koji Shima, and Mutsumi Samejima, all of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

Continuation of Ser. No. 576,282, Jan. 10, 1984, abandoned. This application May 14, 1986, Ser. No. 865,927

Claims priority, application Japan, Jul. 6, 1982, 57-117445; PCT Int'l Appl., Jul. 6, 1983, PCT/JP83/00216

Int. Cl.[4] C07C *51/48, 51/50, 53/08*

U.S. Cl. 562—608 **7 Claims**

1. A process for recovering acetic acid from an aqueous acetic acid solution containing one or more metal salts of sulfuric acid as an impurity, which comprises the steps of:

performing liquid-liquid extraction by flowing said aqueous acetic acid solution countercurrent to an organic liquid extractant consisting essentially of a mixture of a tertiary amine, an oxygen-containing organic solvent and sulfuric acid through a plurality of mixer-settler stages, the amount of sulfuric acid in said organic liquid extractant being at least equimolar to the amount of said metal salt of sulfuric acid in said aqueous acetic acid solution so that said amine reacts with the acetic acid to form an amine salt and said metal salt of sulfuric acid contacts and reacts with the amine salt of acetic acid in a zone containing a high concentration of acetic acid to form a metal salt of acetic acid which is dissolved in the aqueous phase, and then the metal salt of acetic acid reacts with sulfuric acid in a zone containing a low concentration of acetic acid to form a metal salt of sulfuric acid which is dissolved in the aqueous phase and the acetic acid is dissolved in the organic phase; and then separating and recovering the acetic acid from the organic liquid extractant.

4,883,913

STABILIZATION OF CHLOROFLUOROALKANES

Manfred Boedecker; Thomas Benecke; Werner Krücke, all of Hannover, and Willi Baumeister, Meinersen, all of Fed. Rep. of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Fed. Rep. of Germany

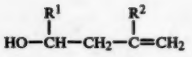
Filed Sep. 8, 1988, Ser. No. 241,468

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1987, 3730221

Int. Cl.[4] C07C *85/26*

U.S. Cl. 564—2 **20 Claims**

1. A method of stabilizing a composition comprising at least one chlorofluoroalkane and an amine or a polyol containing amino groups, said method comprising incorporating into said composition an effective stabilization promoting amount of a but-3-en-1-ol compound corresponding to the formula:



(I)

wherein R^1 and R^2 each individually represent hydrogen, a straight-chain or branched C_1 to C_4 alkyl group, a phenyl group or a substituted phenyl group.

4,883,914

BENZENESULFONYL CARBOXAMIDE COMPOUNDS USEFUL AS HERBICIDAL AGENTS

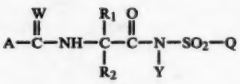
Sergio I. Alvarado, Princeton; Alvin D. Crews, Jr., Plainsboro; Peter J. Wepplo, Princeton; Robert F. Doehner, Jr., East Windsor; Thomas E. Brady, Whitehouse Station; David M. Gange, Princeton, and Desiree L. Little, Burlington, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jul. 7, 1988, Ser. No. 214,507

Int. Cl.[4] C07C *143/78*

U.S. Cl. 564—91 **10 Claims**

1. A herbicidal phenylsulfonyl carboxamide compound of the formula



wherein

A is hydrogen; straight or branched C_1–C_4 alkyl, unsubstituted or substituted with one to three halogens, C_1–C_4 alkoxy, C_1–C_4 alkylthio, C_1–C_4 alkylsulfinyl, C_1–C_4 alkylsulfonyl, carboalkoxy, phenyl, or oxo;

straight or branched C_2–C_4 alkenyl, unsubstituted or substituted with one to three halogens or phenyl;

C_2–C_4 alkynyl, unsubstituted or substituted with one to three halogens;

and A is amino unsubstituted or substituted with straight or branched C_1–C_6 alkyl, C_3–C_6 cycloalkyl, C_1–C_4 haloalkyl, straight or branched C_2–C_6 alkenyl, C_3–C_6 cycloalkenyl, phenyl, benzyl, (di) alkylamino, or C_1–C_4 alkoxy;

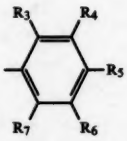
C_1–C_4 alkoxy; or C_1–C_4 alkylthio;

R_1 is C_1–C_4 alkyl;

R_2 is C_1–C_4 alkyl or C_3–C_6 cycloalkyl; and when R_1 and R_2 are taken together with the carbon to which they are attached, they may be C_3–C_6 cycloalkyl unsubstituted or substituted with methyl;

and when R_1 and R_2 are not the same, thus creating an asymmetric center, the optical isomers thereof;

Q is represented by formula (III)



III

wherein

R_3–R_7 are each hydrogen; halogen; nitro; cyano; straight or branched C_1–C_4 alkyl, unsubstituted or substituted with one or more halogens or phenyl;

straight or branched C_2–C_4 alkenyl, unsubstituted or substituted with one to three halogens;

OR_8 where R_8 is hydrogen; C_1–C_4 alkyl unsubstituted or substituted with halogen(s), C_1–C_4 alkoxy, or phenyl; or C_2–C_4 alkenyl unsubstituted or substituted with one to three halogens or phenyl;

phenyl, unsubstituted or substituted with one to three halogens, one to three C_1–C_4 alkyl, one to three C_1–C_4 alkoxy, or one to two nitro;

C_1–C_4 alkylcarbonyl, unsubstituted or substituted with halogen(s);

C_1–C_4 alkylthio, unsubstituted or substituted with halogen(s);

C_1–C_4 alkylsulfinyl, unsubstituted or substituted with halogen(s);

C_1–C_4 alkylsulfonyl, unsubstituted or substituted with halogen(s);

amino, unsubstituted or substituted by C_1–C_4 alkyl;

CO_2R_9 where R_9 is hydrogen, C_1–C_4 alkyl, unsubstituted or substituted with one to three halogens;

R_3–R_4, R_4–R_5, R_5–R_6, R_6–R_7 may also be —(CH=CH—CH=CH)—

which may also be unsubstituted or substituted with up to three of the substituents described for R_3–R_7 above;

with the proviso that no more than three of R_3–R_7 can be: cyano, nitro, (substituted) phenyl, alkylcarbonyl, alkylthio, alkylsulfinyl, alkylsulfonyl, amine, CO_2R_9;

W is O or S;

Y is hydrogen; or a salt thereof, wherein Y is a cation.

4,883,915

CATALYZED OXIME CONVERSIONS

Patrick E. McMahon, Wheaton, Ill., assignor to Amoco Corporation, Chicago, Ill.

Division of Ser. No. 870,822, Jun. 5, 1986, Pat. No. 4,697,010. This application Apr. 8, 1987, Ser. No. 35,868

Int. Cl.[4] C07D *103/38, 201/04, 103/365*

U.S. Cl. 564—155 **6 Claims**

1. A process comprising contacting under reaction conditions the oxime or dioxime of 4,4'-diacetylphenylether together with an inert diluent and a catalyst composition comprising a HAMS-1B crystalline borosilicate molecular sieve incorporated into an inorganic matrix to form N,N'-diacetyloxy(bis-)aniline.

4. A process comprising contacting under reaction conditions the oxime or dioxime of 2,6-diacetylnaphthalene together with an inert diluent and a catalyst composition comprising a HAMS-1B crystalline borosilicate molecular sieve incorporated into an inorganic matrix to form N,N'-diacetyl-2,6-diaminonaphthalene.

4,883,916

POLYPRENYL COMPOUNDS

Kouji Nakamoto, Tsuchiura; Takeshi Suzuki; Shinya Abe, both of Ushikumachi; Kenji Hayashi; Akiharu Kajiwara, both of Yatabemachi; Isao Yamatsu, Ushikumachi; Issei Otsuka, Sakuramura, and Hiroyuki Shiojiri, Yatabemachi, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

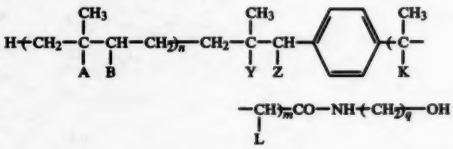
Filed Apr. 1, 1988, Ser. No. 176,637

Claims priority, application Japan, Mar. 15, 1985, 60-50544

Int. Cl.[4] C07C *103/22*

U.S. Cl. 564—186 **2 Claims**

1. A polyprenyl compound represented by the general formula



wherein all of A, B, Y and Z stand for hydrogen atoms, or A and B, and Y and Z form each a single bond between both carbon atoms, n is an integer of 0 to 2, K and L are independently a hydrogen atom or form a single bond when taken together, m is an integer of 0 or 1 and q denotes an integer of 1 or 2.

4,883,917

QUATERNARY AMMONIUM COMPOUNDS

Kim R. Smith; Joe D. Sauer, and James E. Borland, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Oct. 1, 1985, Ser. No. 782,353

Int. Cl.[4] C07C *91/40*

U.S. Cl. 564—292 **1 Claim**

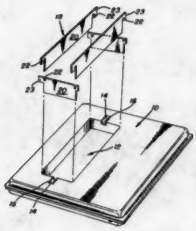
1. Tetradecyl dimethyl 2-methoxyethyl ammonium chloride.

4,883,918

TRANSFORMER MOUNTING PAD HAVING A CABLE OPENING LINED WITH A SAFETY BARRIER

Robert L. Browning, De Kalb County, Ga., assignor to Formex Manufacturing, Inc., Norcross, Ga.

Filed Apr. 20, 1989, Ser. No. 340,663
Int. Cl.[4] H01B *5/00*; H01F *15/02*; F16M *5/00*
U.S. Cl. 174—1 9 Claims



1. A transformer mounting pad having a cable opening extending therethrough and a safety wall system installed in the cable opening, said safety wall system comprising

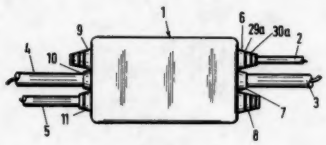
a frame positioned in said cable opening and extending from above said opening through the opening along the sides thereof, said frame comprising four detachable and removable individual wall members detachably attached together at respective adjacent ends, and attaching means on each of said wall members detachably attaching said members together.

4,883,919

APPARATUS FOR SEALING CONJOINED CONDUCTORS OF CABLES

Berthold W. Abele, Walheim/Neckar, Fed. Rep. of Germany, assignor to KSA Dichtsysteme GmbH & Co. KG, Vaihingen/-Enz, Fed. Rep. of Germany

Filed May 16, 1988, Ser. No. 194,240
Claims priority, application Fed. Rep. of Germany, May 15, 1987, 3716252
Int. Cl.[4] H02G *15/113*
U.S. Cl. 174—93 10 Claims



1. An apparatus for sealing joined conductors of cables, comprising:

(a) a distributing box housing through which extends cables to be sealed, said box housing comprising separate housing sections adapted to be sealably connected,

(b) sealing housings associated with said box housing and through which said cables extend into said box housing, each of said sealing housings comprising sealing housing sections adapted to be sealably secured together to form said sealing housing, and

(c) a plurality of axially spaced, flexibly resilient sealing parts mounted in each of said sealing housing sections, said sealing parts having different inner diameters to firmly press and seal cables of various diameters extending through the sealing housing when said sealing housing sections are assembled, and wherein

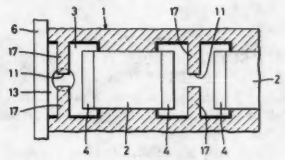
(d) said sealing housing has at least one predetermined breaking point by means of which the sealing housing can be broken off at such point to expose the appropriate size sealing part for a particular cable diameter.

4,883,920

CHIP TYPE COMPONENT INSTALLATION STRUCTURE

Takeshi Tanabe, and Toshio Hori, both of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed May 31, 1988, Ser. No. 200,374
Claims priority, application Japan, Jun. 2, 1987, 62-138612
Int. Cl.[4] H05K *01/18*
U.S. Cl. 174—68.5 6 Claims



1. A chip type component installation arrangement, comprising:

a substrate having a fitting pattern;

a component having an electrode for connection to said fitting pattern of said substrate;

at least two resist film portions, a first said resist film portion disposed on and extending along said fitting pattern and having opposite lateral sides, and both said resist film portions disposed so as to form a gap therebetween on said fitting pattern;

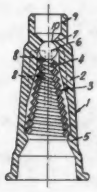
a solder connection portion connecting said electrode to said fitting pattern, said solder connection portion disposed along one lateral side of said first resist film portion and extending continuously therefrom through said gap between said resist film portions to the opposite lateral side of said first resist film portion.

4,883,921

CABLE JOINTING CLAMP

Bengt E. Legerius, and Jan P. R. Tjäderhane, both of Nyköping, Sweden, assignors to Thorsman & Co. Aktiebolag, Nyköping, Sweden

PCT No. PCT/SE87/00058, § 371 Date Oct. 6, 1987, § 102(e) Date Oct. 6, 1987, PCT Pub. No. WO87/05447, PCT Pub. Date Sep. 11, 1987
PCT Filed Feb. 9, 1987, Ser. No. 110,758
Claims priority, application Sweden, Feb. 27, 1986, 8600892.7
Int. Cl.[4] H01R *4/22*
U.S. Cl. 174—87 4 Claims



1. A jointing clamp for connecting together electrical conductors, comprising an insulating, conical outer sleeve having opposite wide and narrow ends, an electrically conductive,

screw-like conical inner sleeve arranged within the outer sleeve and having the form of a worm spring, an electric contact element locked against a seat arranged internally of the narrow end of the conical outer sleeve for sealing said narrow end of said sleeve; said seat being provided therein with a hole which is open towards a tubular extension located adjacent to the narrow end of the outer sleeve and which is formed so as to enable a test probe to establish contact with the contact element and therewith, via the inner sleeve, also with the electrical conductors to be connected by the jointing clamp, said electric contact element comprising a ball, said seat being rounded, said ball being pressed against said seat by said worm spring to close said hole, said tubular extension providing an opening for the test probe, said opening being convergent in proximity to said ball.

4,883,922

COMPOSITE SUPERCONDUCTOR AND METHOD OF THE PRODUCTION THEREOF

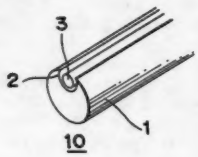
Minoru Yokota; Masayuki Nagata; Shigeo Saito, and Yuichi Yamada, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed May 13, 1988, Ser. No. 193,525

Claims priority, application Japan, May 13, 1987, 62-117651; May 13, 1987, 62-117652; May 13, 1987, 62-117653; May 13, 1987, 62-117654; May 13, 1987, 62-117655; May 13, 1987, 62-117656; May 13, 1987, 62-117657; May 13, 1987, 62-117658; May 13, 1987, 62-117659; May 13, 1987, 62-117660; May 16, 1987, 62-119333

Int. Cl.[4] H01B *12/00*

U.S. Cl. 174—125.1 **21 Claims**



1. A composite superconducting wire which comprises an elongated reinforcing member, at least one groove defined on the surface portion of the reinforcing member so as to extend generally in a longitudinal direction, and ceramic superconductor material accommodated in and extending along said groove, the ceramic superconductor material having a width less than the width of the groove, the groove being open.

4,883,923

ELECTRIC FENCE INSULATOR FOR HOLDING VARIOUS CONDUCTOR TYPES, INCLUDING TAPE-TYPE

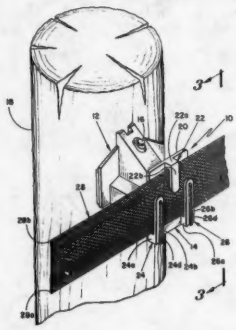
Ronald H. Langlie, and Jon A. Berg, both of Ellendale, Minn., assignors to North Central Plastics, Incorporated, Ellendale, Minn.

Filed Apr. 21, 1989, Ser. No. 343,393

Int. Cl.[4] H01B *17/14*

U.S. Cl. 174—158 F **12 Claims**

1. In combination with a tape-type conductor, an electric fence insulator comprising a body having means disposed at the rear thereof for attaching the body to a fence post, a forwardly facing panel on said body providing a flat surface residing in one plane, and a pair of oppositely directed L-shaped clips on said body, said clips including vertical leg portions forming prongs offset forwardly from the face of said panel and having flat surfaces residing in a rearwardly facing second plane parallel to and spaced forwardly of said one plane, one side of said tape-type conductor confronting the flat surface of said forwardly facing panel and being in a plane closely parallel to said panel, and the other side of said tape-type conductor confronting the rearwardly facing surfaces of said prongs, one of said prongs being more resilient than the



other to permit flexing thereof toward said panel to facilitate insertion of said tape so as to achieve the confronting relationship of said tape with respect to said forwardly facing panel and the rearwardly facing flat surfaces of said prongs.

4,883,924

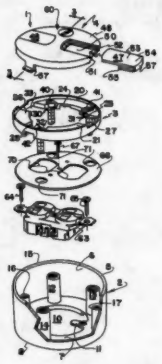
OUTLET FITTING

Robert W. Hadfield, Parkersburg, W. Va., assignor to Butler Manufacuting Company, Kansas City, Mo.

Filed Jul. 20, 1988, Ser. No. 222,054

Int. Cl.[4] H02G *3/12*

U.S. Cl. 174—48 **8 Claims**



1. An outlet fitting to be mounted on the flat top surface of an electrical raceway in alignment with an access hole in the top, the fitting including an attaching ring assembly, an adjusting ring assembly, and a closure assembly:

the attaching ring assembly comprising:

(a) a hollow tubular body having an interior wall;

(b) an annular base member on one end of said tubular body and having an opening therein, the base member being adapted to engage the top of the raceway on which the attaching ring is to be mounted;

(c) clamp means connected to said base member for use in securing the tubular member to the top of said raceway;

(d) a plurality of adjusting ring support posts mounted on said base member and extending parallel to the interior

wall of the body toward the opposite end of the body and each having internal threads, the support posts being spaced inwardly from the interior wall of the body;

the adjusting ring assembly comprising:

(e) an outer annular wall;

(f) support flange means extending inwardly from said outer annular wall, the amount of the inward extention forming an opening in the adjusting ring;

(g) a plurality of ring support means formed in said support flange means;

(h) a plurality of adjusting screws each formed with a support ledge, the adjusting screws being respectively threaded into the threads of said attaching ring support posts and in each adjusting screw, the ledge of each adjusting screw being in engagement with said ring support means;

the closure assembly comprising:

(i) substantially flat plate means;

(j) securing means on said flat plate means engaging said adjusting ring and releasably securing the flat plate means to the adjusting ring; and

(k) means on said substantially flat plate means forming opening means to provide for the passage of electrical conductors.

4,883,925

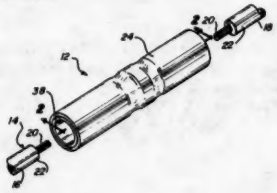
SEALED SOLDER CONNECTOR ASSEMBLY AND METHOD OF USE

Albert C. Graf, 332 Bunker Hill Dr., Pensacola, Fla. 32507

Filed May 2, 1988, Ser. No. 189,142

Int. Cl.[4] H02G *15/18*

U.S. Cl. 174—84 R **5 Claims**



1. A sealed solder connector assembly used to permanently join and enclose adjacent ends of severed members, comprising:

(a) a main support member of tubular shape;

(b) a cylindrical anchor member secured within said main support member;

(c) said main support member constructed of a heat-shrinkable material;

(d) said anchor member constructed of low temperature heat melt material;

(e) said melt material includes a low temperature melt solder material having an inner flux coating thereon; and

(f) said solder material composed of 50 percent tin, 32 percent lead, and 18 percent cadmium;

whereby, the subsequent application of heat about an exterior surface of said main support member causes said main support member to shrink into a skin and airtight fit over said severed members to be enclosed thereby and said anchor member melts and fuses with said severed members.

4,883,926

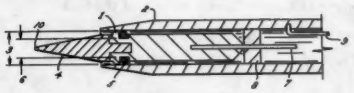
STYLUS SWITCH

Richard R. Baldwin, Saratoga, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 21, 1988, Ser. No. 184,513

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **27 Claims**



1. A stylus switch comprising:

a stylus housing having a first end, said first end having an opening;

a stylus tip positioned to extend from said opening of said stylus housing;

switch means responsive to radial movement of said stylus tip with respect to said stylus housing;

a power source located within said stylus housing;

signal means for providing a signal in response to said switch means wherein said signal means is located in said stylus tip and provides said signal through a signal transmission means to a point on said stylus tip.

4,883,927

LOCKING ARRANGEMENT FOR TWO SWITCHGEARS

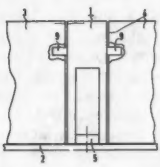
Walter Apfelbacher, Freihung; Edgar Wiessner, Amberg, and Karl-Hans Bärnklau, Weiden, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,200

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1987, 8714499[U]

Int. Cl.[4] H01H *9/20*

U.S. Cl. 200—50 C **7 Claims**



1. A locking arrangement for two switchgears which each include means for activating said switchgears being coupled via a blocking body in such a way that upon activation of one switchgear the activation of the other switchgear, which acts upon the blocking body in a sense opposite to that of the one switchgear is blocked, said locking arrangement comprising:

a guide housing separate from the switchgears and fastenable there between;

said olocking body comprising an essentially heart-shaped blocking body, said blocking body including a tip and a pair of lobes;

said blocking body being guided with the tip of the blocking body in said guide housing separate from the switchgears; and

means for providing interaction between said lobes of the heart-shaped blocking body and said means for activating, wherein said means for providing interaction comprises,

a pair of slides guided in the guide housing, one slide associated with each of said lobes,

two tappets, one associated with each lobe of said blocking body,

a plurality of dogs, each dog rigidly connecting a lobe with its associated tappet in the direction of motion, and

means for adjustably coupling each of said slides with one of said two tappets wherein said means for adjustably coupling comprises a collar screw including a collar wherein said collar screw is in a screw connection with said slide and wherein said collar is rigidly connected to one of said tappets in a direction of motion of the slide.

4,883,928

FLOAT SWITCH, A CONTROL APPARATUS AND A WARNING APPARATUS OF AN ENGINE

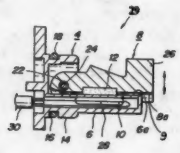
Kazuhiro Umehara, Hamamatsu, Japan, assignor to Suzuki Jidosha Kogyo Kasbushiki Kaisha, Shizuoka, Japan

Division of Ser. No. 750,962, Jul. 2, 1985, Pat. No. 4,755,790. This application Apr. 1, 1988, Ser. No. 176,635

Claims priority, application Japan, Jul. 4, 1984, 59-138816; Dec. 25, 1984, 59-275106

Int. Cl.[4] H01H *35/40*

U.S. Cl. 200—81.9 M **5 Claims**



1. A switch for sensing fluid flow therepast in a first direction, comprising: a main body having thereon an outward projection which extends generally transverse to said first direction; a reed switch provided on said projection; and a member having a magnet thereon and supported on said main body for movement between first and second positions in which said magnet is respectively adjacent and spaced from said reed switch, said reed switch being actuated by the magnetic field of said magnet when said magnet is in said position adjacent said reed switch, said member including a portion having thereon a substantially flat surface which faces in a second direction substantially opposite said first direction, said portion moving approximately in said first direction as said member moves away from said first position thereof; wherein said member is supported at one end on said main body for pivotal movement about a pivot axis which extends in a direction transverse to the direction in which said projection projects outwardly from said main body and transverse to said first direction; wherein said portion of said member is an enlarged end portion at an end thereof remote from said pivot axis; wherein said projection has a convex surface thereon which faces said member and said member has in said substantially flat surface a groove containing a concave surface which faces said projection; wherein in said first and second positions said concave and convex surfaces are respectively adjacent and spaced from each other; wherein in said adjacent position of said convex and concave surfaces said magnet and said reed switch are in said adjacent position and said enlarged end portion of said member projects outwardly past an outer end of said outward projection; and wherein said magnet is partially embedded in said member but has a portion which projects outwardly from said concave surface into said groove.

4,883,929

BARRIER ASSEMBLY FOR MOUNTING CONTROLLING DEVICES

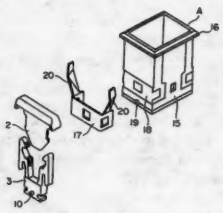
Kenji Shinohara, Osaka; Takashi Niwa, Kyoto, and Yoshihiro Wakatsuki, Shimane, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Mar. 9, 1988, Ser. No. 166,089

Claims priority, application Japan, Mar. 17, 1987, 62-39780[U]; Jun. 22, 1987, 62-95609[U]

Int. Cl.[4] H01H *9/08*

U.S. Cl. 200—5 R **7 Claims**



1. A barrier assembly comprising:

a mounting panel with an opening therein;

a pluralty or controlling devices;

a first barrier member which is inserted from the front side of a mounting panel; and

a second barrier member which is inserted from the rear side of said mounting panel and connected to said first barrier member;

said first barrier member being snap-fit to said second barrier member and said barrier assembly holding said plurality of controlling devices in a line within said opening and partitioning off said controlling devices which are adjacent to each other.

4,883,930

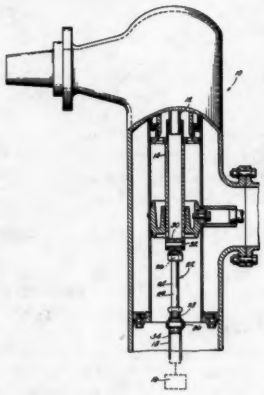
SWITCH MECHANISM OPERATING ROD

Donald R. Martin, Waukesha, Wis., assignor to Cooper Power Systems, Inc., Houston, Tex.

Filed Oct. 30, 1987, Ser. No. 115,538

Int. Cl.[4] H01H *33/42*

U.S. Cl. 200—148 F **7 Claims**



1. A switch apparatus comprising

a switch mechanism including a first contact, and a second contact movable into and out of engagement with said first contact for respectively closing and opening said switch mechanism,

an operating rod assembly connected to said second contact for moving said second contact into and out of engagement with said first contact in response to movement of said operating rod assembly, said operating rod assembly including an operating rod having an outer surface, a first end adapted to be connected to a prime mover, and an opposite second end, and a conductive member connected to said second end of said operating rod and to said second contact, said conductive member including a first portion contacting and connected to said second end of said rod, and a second portion connected to said first portion, said second portion extending, from said first portion, in the direction away from said second end of said rod, said second portion telescopingly overlapping said rod, and said second portion including a radially inner surface facing said outer surface of said rod, a radially outer surface facing away from said outer surface of said rod, and an end surface generally facing away from said second end of said rod and extending between said inner surface and said outer surface, said end surface including an inner portion located adjacent said inner surface and having a first radius of curvature, and an outer portion located adjacent said outer surface and having a second radius of curvature which is greater than said first radius of curvature, and

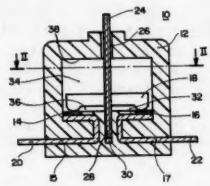
means for enclosing said switch mechanism and said operating rod assembly and surrounding said switch mechanism and said assembly with dielectric gas.

4,883,931

HIGH PRESSURE ARC EXTINGUISHING CHAMBER

Pierre Batteux, Vizille, and Jean-Pierre Nereau, La Tronche, both of France, assignors to Merlin Gerin, Grenoble Cedex, France

Filed Jun. 13, 1988, Ser. No. 206,132
Claims priority, application France, Jun. 18, 1987, 8708583
Int. Cl.[4] H01H *33/70*
U.S. Cl. 200—148 R **6 Claims**



1. An arc extinguishing chamber for an electrical switchgear device, notably a circuit breaker or a current limiting unit, comprising:

a system of stationary and movable contacts, housed inside an almost tightly sealed case made of insulating material, the movable contact being biased to the open position by the pressure generated by the arc drawn between the contacts after separation,

a compression piston separated from the walls of the case by a predetermined clearance J subdividing the internal volume of the case into a first compartment generating pressure due to the action of the arc, and a second compartment communicating with said first compartment via the clearance J, the volumes of the two elementary compartments varying inversely to one another when movement of the movable contact occurs,

the movable contact appreciably following the internal configuration of the case playing the role of said piston,

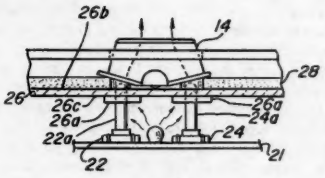
and high-speed opening means by electrodynamic repulsion resulting from the loop arrangement of said contacts, said repulsion taking place as soon as a short-circuit current occurs followed by the piston effect of the movable contact by the pressure generated by the arc.

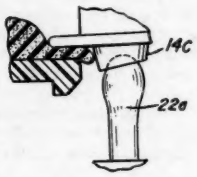
4,883,932

LINKAGE-TYPE SWITCHES FOR CONTROL PANEL ACTUATORS

James E. Van Hout, Auburn Heights, and Lee M. Dziekan, East Detroit, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Continuation of Ser. No. 87,728, Aug. 21, 1987, abandoned. This application Jun. 6, 1988, Ser. No. 229,741
Int. Cl.[4] H01H *23/30*
U.S. Cl. 200—339 **2 Claims**





1. A linkage switch-type mechanism for controlling a first and a second electric circuit, comprising:

(a) an actuator member rockably mounted about a rotational axis in an opening of an escutcheon plate of a control panel and having a front face divided to form a first section and a second section for causing angular movement in opposing directions;

(b) first and second switch means occupying remote locations from the rear of said actuator member, substantially in-line with said first and second sections respectively, providing substantially increased clearance between the rear of the actuator member and the first and second electric circuits, said first and second switch means having a first and a second snap-some disk respectively, electrically coupled to the first and second circuits for alternately closing and opening the two circuits in response to angularly driving the first and second sections of said actuator member about the rotational axis, said first and second switch means having first and second elongated and compressible plungers respectively, each of said plungers having a front end for contacting a top location on said first and second disks for connecting said first and second disks to said actuator member;

(c) first and second receptacle means spaced apart on the rear surface of said actuator and in alignment with said first and second sections respectively for receiving a distal end of said first and second plungers respectively so that a ball and socket-type joint is formed linking said first and second switch means to said actuator member;

(d) a returning means comprised of a layer of a resilient foam disposed upon a structural member mounted in spaced-apart relationship to the escutcheon plate, said structural

member having a first and second aperture means through which the distal ends of said first and second plungers are routed to be received by said first and second receptacle means so as to maintain the linkage, for returning said actuator member to neutral position after said first and second sections of said actuator member have been driven angularly about the rotational axis, said first and said second aperture means including a first and a second guide port respectively; and

(e) a frame encompassing a lower peripheral edge of said actuator member;

said first section of said actuator member when actuated by an actuating force causing said frame to depress the foam of said returning member and causing transmission of the actuating force to the associated ball and socket joint formed by the distal end of said first plunger and said first receptacle means, said joint absorbing a portion of the actuating force, said joint rotating in concert with said first section of said actuator member about the rotational axis of said actuator member causing an upper region of said first plunger to move laterally along an arcuate path from its free position to its operating position while a lower region of said first plunger travels linearly and applies a compressive force against the top surface of said first snap-dome disk causing said first disk to flex inwardly against an opening in the first circuit to complete the circuit, said second plunger remaining positioned between the top of said second disk and said second receptacle means under the unpressed second section of said actuator member, said first disk being completely depressed after flexing inwardly against the opening in the first circuit, the length of said first plunger being substantially decreased as said first section of said actuator member continues to rotate until said frame completely compresses the foam.

4,883,933

TRAVELING WIRE ELECTROEROSION MACHINE

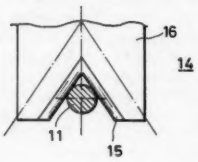
Takeshi Yatomi, and Makoto Tanaka, both of Nagoya, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 18, 1987, Ser. No. 65,246

Claims priority, application Japan, Jun. 18, 1986, 61-140309; Jun. 18, 1986, 61-140310

Int. Cl.[4] B23H *7/10*

U.S. Cl. 219—69.12 **2 Claims**



1. In a travelling wire electroerosion machine in which an electrical discharge is generated in a narrow gap between a wire electrode and a workpiece through a processing liquid so as to erosively remove material from said workpiece, the improvement comprising a wire guide device for supporting and guiding said wire electrode wherein said wire guide device comprises a V-shaped guide member including coplanar intersecting guide surfaces, each of said guide surfaces having a single, continuous, convex, arcuate wire engaging surface.

4,883,934

MACHINE USING A WIRE FOR USE IN ELECTROEROSION

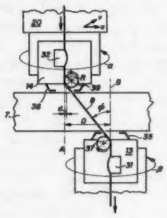
Pierre-Alexandre Mamin, Geneva, Switzerland; Bernard Babel, and Francois Balleys, both of Petit-Lancy/GE, Fed. Rep. of Germany, assignors to Charmilles Technologies S.A., Meyrin, Switzerland

Filed Apr. 4, 1988, Ser. No. 176,874

Claims priority, application Switzerland, Apr. 3, 1987, 1290/87-6

Int. Cl.[4] B23H *7/10*

U.S. Cl. 219—69.12 **9 Claims**



1. A machine for usage of electroerosion of an electrode piece by means of a stretched electrode wire and divided between two wire guides with at least one device of cross movements carrying one of these wire guides and arranged in such a fashion in order to displace it into a parallel plane to the one of the trajectory to cut in a fashion by inclining the wire to a predetermined angle in relation to a neutral perpendicular axis to this plane and characterized by the fact that this device is equally arranged in order to rotate the wire guide around a mobile axis parallel to the neutral axis passing by this guide and displacing itself with it by a device put into action in order to subjugate the rotation of the wire guide to displacements of the device to cross movements.

4,883,935

SEPARABLE RECOMBINABLE MULTI-PART CONTAINER WITH SEPARATELY SEALED CHAMBERS

Tim M. Fairchild, 33 East Elm St.; Caroline Laska, 522 N. Darling St., and Gary H. Ward, 418 Vista La., all of Fremont, Mich. 49412

Filed Aug. 4, 1988, Ser. No. 228,623

Int. Cl.[4] B65D *71/00*; H05B *6/64*

U.S. Cl. 219—10.55 E **16 Claims**

1. A multi-part container for use in a microwave, comprising:

a bottom portion having an upper sealed opening and defining a first interior region for housing first contents to be subjected to a specified treatment;

an upper part having a lower sealed second opening and defining a second interior region for second contents, said upper part further being sealed to said bottom portion after treatment of the first contents;

said upper sealed opening and said lower sealed opening being in face-to-face relationship to each other;

said bottom portion and said upper part being separable from each other and individually openable at each of said openings, thereby exposing the contents of said first and second interior regions;

said first interior region being configured to simultaneously accommodate both the first and second contents for use in the microwave.

4,883,936

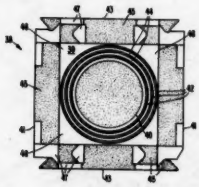
CONTROL OF MICROWAVE INTERACTIVE HEATING BY PATTERNED DEACTIVATION

Patrick L. Maynard, Combined Locks; Michael A. Schmelzer, Appleton, and Thomas D. Pawlowski, Neenah, all of Wis., assignors to James River Corporation, Richmond, Va.

Filed Sep. 1, 1988, Ser. No. 239,264

Int. Cl.[4] H05B *6/80*

U.S. Cl. 219—10.55 F **23 Claims**



1. A microwave interactive heating element capable of converting microwave radiation to heat energy to heat a food product proximate to said heating element, wherein said element is formed of a layer of microwave interactive material supported on a substrate and said element includes a plurality of first areas having a reduced capability to generate heat in response to microwave radiation and a plurality of second areas having an unaltered capability to generate heater in response to microwave radiation arranged in a predetermined pattern relative to said first areas, wherein said pattern is formed by selectively deactivating without removing selected areas of said microwave interactive material from said substrate in the predetermined pattern to form said first areas and by leaving the remainder of said predetermined pattern untreated to form said second areas, thereby producing preselected temperature differences in said food product corresponding to said pattern when said heating element is subjected to microwave radiation.

4,883,937

BUTT WELDING METHOD BY MEANS OF LASER BEAM

Kenji Matsuno; Tsuneo Imatani; Nobuyuki Sato; Osamu Teruuchi, and Hideo Kurashima, all of Kanagawa, Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

Filed Sep. 23, 1988, Ser. No. 248,061

Claims priority, application Japan, Sep. 30, 1987, 62-244365; Oct. 16, 1987, 62-259457; Feb. 26, 1988, 63-42277

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121.64 **21 Claims**

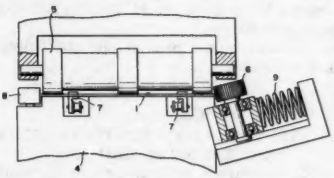
1. A method of butt-welding thin plate members, comprising the steps of:

preparing thin plate members, having a thickness less than or equal to approximately 0.4 mm, provided with end surfaces to be butted together, respectively;

forming a recess means in the end surface of at least one of said thin plate members;

butting linearly said end surfaces of said thin plate members to each other at at least two laterally spaced regions and substantially throughout the thickness of said members so as to define a stable butt contact with respect to each other and with a gap, defined by said recess means, therebetween; and

irradiating a laser beam, at a high rate of speed of at least 20



m/min, along said butted end surfaces of said thin plate members so as to include said recess means whereby said end surfaces of said butted plate members are welded together without the generation of protrusions and undercuts, as welding faults, upon the laser beam side, and the opposite side, surfaces, respectively, of said plate members.

4,883,938

METHOD AND APPARATUS FOR AUTOMATICALLY PERFORMING WORK ON AN OBJECT ALONG A DESIRED PATH

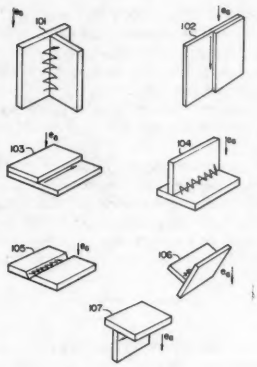
Shinichi Sarugaku, Funabashi, Japan, assignor to Hitachi Ltd., Tokyo and Hitachi Keiyo Engineering Co., Ltd., Narashino, both of, Japan

Filed Apr. 21, 1988, Ser. No. 184,189

Claims priority, application Japan, Apr. 24, 1987, 62-100130

Int. Cl.[4] B23K *9/12*

U.S. Cl. 219—124.34 **29 Claims**



3. An automatic working method capable of automatically setting welding conditions comprising the steps of:

preparing predetermined sets of optimum welding conditions for individual combinations of various values representative of each of at least the welding direction relative to the direction of gravity, the direction of a welding torch relative to the gravitational direction and the joint geometry of a work piece to be welded;

teaching a welding path along which said welding torch is to proceed and a welding torch direction;

deriving from said taught welding path and welding torch

direction the welding direction relative to the gravitational direction and the welding torch direction relative to the gravitational direction;

inputting a joint geometry of said work piece;

selecting from said prepared sets of optimum welding conditions one set of optimum welding conditions on the basis of said derived welding direction and welding torch direction relative to the gravitational direction and said inputted joint geometry; and

executing welding on the basis of said selected optimum welding conditions.

4,883,939

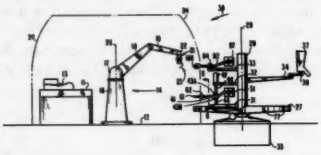
AUTOMATIC TOOL CHANGER FOR WORKPIECE PROCESSING MACHINES

Nehemia Sagi, Indianapolis, Ind., assignor to Automatic Tool Control and Management Systems, Inc., Carmel, Ind.

Filed Jun. 21, 1988, Ser. No. 209,686

Int. Cl.[4] B23K *9/12*

U.S. Cl. 219—125.1 **31 Claims**



1. In a system for processing a workpiece with one or more processing tools and wherein a tool is mounted on an effector for causing the tool to operate on a workpiece, the improvement comprising:

tool mounting apparatus including a tool adaptor having means thereon for receiving and securing one of said tools thereon; and

an effector adaptor having means thereon for attachment to said effector;

said tool adaptor having a body that is generally symmetrical about an axis and having first and second outwardly projecting flanges mounted on said body and projecting in directions radially outward from said axis and located on opposite sides of said axis;

said effector adaptor having a groove receiving said flanges whereby said tool adaptor is secured to said effector adaptor;

said flanges being movable inward on said body relative to said axis to remove the flanges from the groove and thereby enable separation of the tool adaptor from the effector adaptor, and said flanges being biased outwardly from said axis and movable outward from said axis to securely re-engage said flanges in said groove and thereby again secure the tool adaptor to said effector adaptor.

4,883,940

HEATABLE COMPOSITE BACKLIGHT PANEL

Stephen P. Tokarz, Lincoln Park, Mich., assignor to ASC Incorporated, Southgate, Mich.

Filed Jul. 7, 1988, Ser. No. 215,990

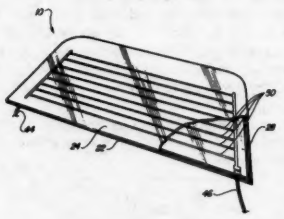
Int. Cl.[4] B32B *27/40*; B60L *1/02*

U.S. Cl. 219—203 **19 Claims**

1. A heatable backlight panel for a convertible top of a vehicle, which comprises:

(a) a first laminate, the first laminate made of a first nonconductive material, having an anode and a cathode disposed on a first surface thereof;

(b) an interlayer having a plurality of electrical members, the electrical members forming a plurality of electrical paths between the anode and the cathode, the interlayer being applied onto the first surface of the first laminate by a silk screening process, the anode and the cathode being electrically engageable with a power source; and



(c) a second laminate disposed over the first surface of the first laminate, the second laminate being made from the first nonconductive material, the first laminate being fused to the second laminate to form a composite structure.

4,883,941

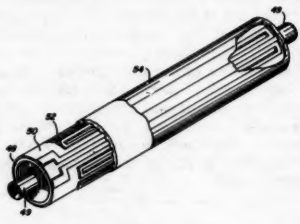
FILAMENT WOUND FOIL FUSING SYSTEM

Robert G. Martin, Rochester, and Paul C. Swanton, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 6, 1986, Ser. No. 893,852

Int. Cl.[4] H05B *1/00*

U.S. Cl. 219—216 **2 Claims**



1. In an electrostatic copying machine having pressure fusing apparatus of the type including an instantly heated fuser roll and a pressure back-up roll defining a nip through which support material bearing toner images is passed for fusing the toner images onto the support material, the fuser roll being raised approximately 120° C. in less than 10 seconds, the instantly heated fuser roll comprising:

a hollow, relatively thin, filament wound cylinder less than 40 mils thick, the cylinder having an outside and an inside surface, the cylinder enclosing ambient air;

a source of thermal energy affixed by a high temperature adhesive to the outside surface of said cylinder; and

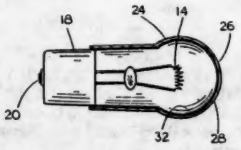
the source of thermal energy being a heating circuit element, the heating circuit element being embedded in the filament wound cylinder and patitioned into segments for selective application of the thermal energy.

4,883,942

LOW VOLTAGE HEATING ELEMENT FOR PORTABLE TOOLS

Frank E. Robak, Sr., and Andrew H. Robak, Jr., both of Omaha, Nebr., assignors to RobaTherm Products, Omaha, Nebr.

Filed Mar. 21, 1988, Ser. No. 170,921
Int. Cl.[4] H05B *3/06*
U.S. Cl. 219—227 **23 Claims**



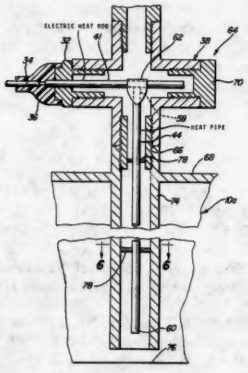
22. A portable curling iron, comprising:
a hollow housing;
a hollow, heat-conducting metal tube mounted on said housing and projecting therefrom;
a low voltage, low direct current heating element removably mounted within said hollow metal tube for heating the same;
said heating element including:
a low voltage, low direct current light bulb having a globe portion at an end portion thereof and a base portion;
means for powering said light bulb electrically at a voltage of substantially twelve volts or less connected to said light bulb; and
a thin metal heat conducting jacket wrapped around and contacting at least a portion of said globe portion of said bulb, said bulb being adapted to produce heat in excess of 150° F.

4,883,943

ELECTRIC HEATER FOR FUEL TANK DISCHARGE OPENING COUPLING TO PREVENT FUEL WAXING

Leland L. Davis, Saline, Mich., assignor to Davco Manufacturing Corporation, Slaine, Mich.

Filed Dec. 16, 1987, Ser. No. 133,801
Int. Cl.[4] H05B *3/82*; F02M *31/12*; F24H *1/10*; F28D *15/02*
U.S. Cl. 219—306 **22 Claims**



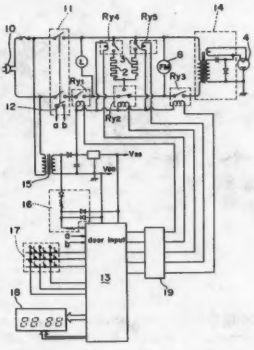
1. A heated fuel delivery system coupling adapted for use with a fuel tank having a discharge opening, and wherein a conduit is adapted to be connected to said coupling for directing flow of fuel from the tank through the conduit to a combustion device, said coupling comprising:
a hollow fitting body having a fuel flow passage therethrough, said body having at least two fuel flow openings communicating with said passage, including a first fuel flow opening adapted to be connected to the discharge opening of a fuel tank and a second fuel flow opening adapted to be connected to the conduit;
active heating means in said passage acting as a heat source for warming fuel within said passage; and
a passive heat transfer means in said passage thermally coupled to said active heating means and extending outwardly through said first opening a distance sufficient that when the first opening is connected to the discharge opening of the fuel tank the passive heat transfer means extends into the tank through the discharge opening thereof for heating fuel in the vicinity of the discharge opening thereby reducing fuel waxing.

4,883,944

HEATING APPARATUS HAVING AN OPEN-LOOP CONFIGURATION FOR CONTROLLING TEMPERATURE

Teruhisa Takano, Osaka; Takahiko Yamasaki, and Mitsuo Akiyoshi, both of Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jun. 23, 1988, Ser. No. 211,417
Claims priority, application Japan, Jun. 23, 1987, 62-155902; Jun. 23, 1987, 62-155908; Jun. 23, 1987, 62-155909
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—492 **6 Claims**



1. A device for controlling a heating apparatus having a heating chamber, said device comprising:
an electrical power source for outputting a first power source level and a second power source level which is different from said first power source level, said electrical power source driving a heating element of said heating apparatus;
a setting means for setting a predetermined chamber temperature value and a cooking operation time;
a time counting means for counting and storing a first operation time period in which said heating element is driven at said first power source level, and for counting and storing a second time period in which said heating element is driven at said second power source level, and for counting and storing a stop time period in which said heating element is driven at a power level substantially equal to zero;
an equation storing means for storing a first calculating equation representing a relationship during said first operation time between a change in chamber temperature and a unit of time in which said chamber temperature increases during said first operation time, and for storing a second calculating equation representing a relationship during

said second operation time between a change in said chamber temperature and a unit of time in which said chamber temperature remains constant at said predetermined chamber temperature value during said second operation time, and for storing a third calculating equation representing a relationship during said stop time period between a change in said chamber temperature and a unit of time in which said chamber temperature decreases during said stop time period;

an output deciding means for selectively driving said heating element at one of said first output level and said second output level in accordance with said first, second and third calculating equations;

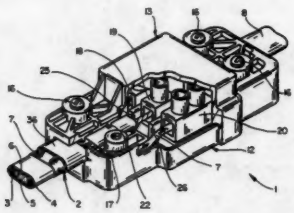
wherein said output deciding means determines an initial chamber temperature on the basis of said third calculating equation and a duration of said stop time period, and wherein said output deciding means drives said heating element at said first output level and determines when said predetermined chamber temperature level has been reached on the basis of said first calculating equation and said initial chamber temperature.

4,883,945

CONNECTOR FOR ELECTRICAL HEATER

Richard L. Bautista, Union City, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Dec. 8, 1988, Ser. No. 281,580
Int. Cl.[4] H01R *9/03*
U.S. Cl. 219—541 **16 Claims**



1. A connector for connecting an end of an elongate electrical heater to an end of an elongate electrical component, said heater comprising (a) first and second elongate electrodes, (b) a plurality of resistive heating elements connected in parallel between said electrodes, (c) an insulating jacket surrounding said electrodes and heating elements, and (d) a metallic grounding braid surrounding said insulating jacket, and said electrical component comprising first, second and third elongate members for connection to the first electrode, the second electrode, and the grounding braid respectively, said connector comprising

(1) first and second shell members which can be in (a) a demated configuration or (b) a mated configuration in which the shell members are in contact with each other and form a shell having a first inlet port for the heater and a second inlet port for the electrical component;

(2) securing means for releasably maintaining the shell members in the mated configuration;

(3) a first terminal block for connecting the first electrode to the first elongate member of said electrical component within the shell;

(4) a second terminal block for connecting the second electrode to the second elongate member of said electrical component within the shell;

(5) a third terminal block for connecting the grounding braid to the third elongate member of said electrical component within the shell; and

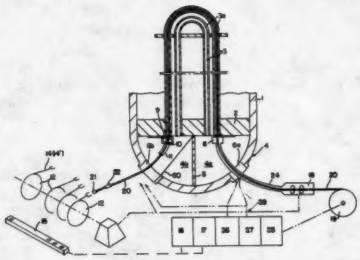
(6) a plurality of first gripping members associated with the first shell member, and at least one second gripping member associated with the second shell member, the first and second gripping members being such that, when the shell members are brought from the demated configuration into the mated configuration after the electrical heater has been connected to the electrical component via the terminal blocks within the connector, the gripping members are forced against opposite faces of the heater within the shell adjacent the first inlet port and at longitudinally spaced intervals on the heater, thus forcing the heater to form a serpentine configuration.

4,883,946

HEATING APPARATUS, PARTICULARLY FOR THE HEAT TREATMENT OF A TUBE OF SMALL DIAMETER AND OF CURVED SHAPE

Paul Jacquier, Tassin la Demi-Lune, France, assignor to Framatome, Courbevoie, France

Filed Mar. 25, 1988, Ser. No. 172,819
Claims priority, application France, Mar. 25, 1987, 87 04158
Int. Cl.[4] H05B *3/06*
U.S. Cl. 219—523 **14 Claims**



1. Heating apparatus for the heat treatment of a tube (3) of small diameter and of curved shape over at least part of its length, which apparatus comprises a flexible heating element (14) consisting of an electric resistance wire (33) wound helically to form a winding whose outside diameter is smaller than the inside diameter of the tube (3), together with an arrangement of means (8, 9, 10, 11, 12, 18, 25, 26, 27) for guidance, displacement and location of the heating element (14) in the tube (3), wherein the electric resistance heating wire (33) constitutes the central core of a coaxial cable (32) comprising an outer tubular metal sheath (34) and an insulating material (35) interposed between the central core (33) and the outer sheath (34), the coaxial cable (32) being wound to form a helical winding (31).

4,883,947

RESISTANCE CERAMIC HEATER WITH MUTUALLY CONNECTED HEAT-GENERATING CONDUCTORS, AND ELECTROCHEMICAL ELEMENT OR OXYGEN ANALYZER USING SUCH CERAMIC HEATER

Takao Murase, Kohnan, and Tsunenori Yoshimura, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Mar. 6, 1989, Ser. No. 319,159
Claims priority, application Japan, Mar. 9, 1988, 63-55471
Int. Cl.[4] H05B *3/6*; H01C *7/00*
U.S. Cl. 219—553 **12 Claims**

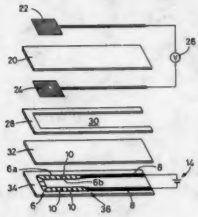
1. A resistance ceramic heater comprising:

a ceramic substrate; and

a heating element including a resistance heat-generating portion, and electrical leads connected to said heat-generating portion for energizing the heat-generating portion to generate heat,

said heat-generating portion consisting of a plurality of

electrically resistive heat-generating conductors formed in parallel connection with each other and in series connection to said electrical leads, and a plurality of connecting conductors which connects said plurality of heat-



generating conductors, at a plurality of connection points on each of said plurality of heat-generating conductors, said connecting points being spaced apart from each other along a length of said each heat-generating conductor.

4,883,948

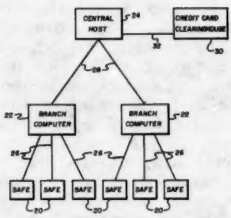
CREDIT CARD STORAGE SYSTEM

Steven L. Sunyich, 402 E. Springhill Cir., North Salt Lake, Utah 84054

Continuation of Ser. No. 170,310, Mar. 18, 1988. This application Apr. 17, 1989, Ser. No. 338,740

Int. Cl.[4] G06K *5/00*

U.S. Cl. 235—382 **20 Claims**



1. A credit card operable storage system, comprising:
a secure container for storage of items;
a door associated with said container;
a locking mechanism associated with said door to selectively actuate between a locked position to lock said door in a closed position and an unlocked position to allow said door to open;
a card reader associated with said container;
a processor communicatively linked to said locking mechanism and said card reader, said processor being programmed to receive card information from said card reader, to open said locking mechanism based on appropriate card information, to develop use information, and to relay said use information to a billing development means; and
a billing development means communicatively linked to said processor for receiving use information from said processor and for developing billing information.

4,883,949

DATA READER

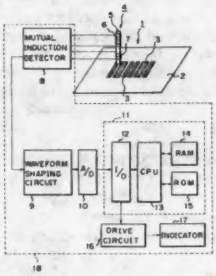
Hiroshi Kokubo, 10-8 Ohharano-Kamisato-Momiji-cho, Nishikyo-ku, Kyoto city, 610-11, Kyoto, and Kinji Tsuboi, Yokohama, both of Japan, assignors to Tokyu Car Corporation, Yokohama and Hiroshi Kokubo, Kyoto, both of, Japan

Filed Apr. 26, 1988, Ser. No. 186,438

Claims priority, application Japan, Apr. 27, 1987, 62-104108

Int. Cl.[4] G06K *7/08*

U.S. Cl. 235—449 **12 Claims**



1. A data reader assembly comprising:
an induction coil, supplied with an alternating current, and generating an induction current;
data recording means having a substrate of a first material and patterns of a second material which is a different material than said first material so as to cause a change in the impedance of said induction coil and thereby change an amount of said induction current when coming close to said induction coil; and
means for reading information in said data recording means on the basis of an output of induction current generated in said induction coil.

4,883,950

COMPOSITE MAGNETIC AND OPTICAL HEAD

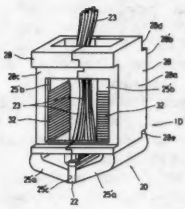
Kazuo Chiba; Yoshiaki Ohishi, both of Ichihara; Jituo Migita, Sakai; Hajime Mochizuki, and Takao Kobayashi, both of Yokohama, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Feb. 22, 1988, Ser. No. 159,041

Claims priority, application Japan, May 23, 1987, 62-126522; May 23, 1987, 62-126525

Int. Cl.[4] G06K *7/01;* **G11B** *13/04*

U.S. Cl. 235—440 **17 Claims**



1. In a composite magnetic and optical head comprising:
a magnetic sensor including a magnetic core means having an elongated distal gap and adapted to detect a magnetic pattern recorded on a record medium;
an optical sensor including a nonmagnetic light transmitting member located along said distal gap of said magnetic

sensor and an optical fiber bundle having one end connected to said light transmitting member, and adapted to detect an optical pattern recorded on said record medium; and

a holder containing said magnetic and optical sensors in an internal space thereof, said holder having two opposite side walls extending substantially at right angles to the length of said distal gap of said magnetic core means and one end face from which said distal gap projects outward,

the improvement wherein:

said magnetic core means includes a wide portion, situated close to said distal gap and projecting outward from said one end face of said holder, and a narrow portion surrounded by said holder so as to be located behind said one end face, said wide portion being at least wider than the distance between said opposite side walls.

4,883,951

METHOD AND SYSTEM FOR DETECTING WHETHER AN OPTICAL SYSTEM IS IN FOCUS USING AN IMPROVED INTERPOLATION TECHNIQUE

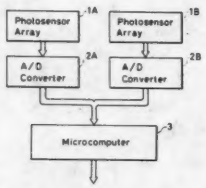
Shotaro Yokoyama, and Takashi Nishinbe, Kawasaki, both of Japan, assignors to Fuji Electric Company Ltd., Kawasaki, Japan

Continuation of Ser. No. 96,530, Sep. 15, 1987, abandoned. This application Mar. 21, 1989, Ser. No. 326,799

Claims priority, application Japan, Nov. 10, 1986, 61-265469

Int. Cl.[4] G01J *1/20;* G03B *3/00*

U.S. Cl. 250—201 **3 Claims**



1. A focus detection system in which light from a object is incident on first and second photosensor arrays via an optical system to form a first image on the first array and a second image on the second array to obtain a relative displacement amount X between the first image with respect to the first array and the second image with respect to the second array, so as to determine whether said optical system is in focus or not, each array generating a respective pattern of signals in response to light falling on the photosensors of the respective array, said system comprising:

means for storing a function f(i) expressing inconsistency between the pattern of signals from the first array and the pattern of signals from the second array when the patterns are shifted with respect to one another by a shift amount i and compared with each other, the shift amount i being an integer which represents the difference between a photosensor position in the first array and a photosensor position in the second array;

means for obtaining function values $f(i_0)$, $f(i_0-1)$, $f(i_0-2)$, $f(i_0+1)$ and $f(i_0+2)$ corresponding to i_0, (i_0-1), (i_0-2), (i_0+1) and (i_0+2), were i_0 is the value of the shift amount i when f(i) is at a minimum;

means for computing an amount I =X/p (p =pitch of the arrayed photosensors in the photosensor arrays) from said function values, said amount I being given by formulas (1) and (2) below:

$$I=i_0+\frac{1}{2}-\{f(i_0+1)-f(i_0)\}/A \quad (1)$$

where

$A=2\{B_1+K_1(B-B_2)\}$

$B_1=f(i_0-1)-f(i_0)$

$B_2=f(i_0+2)-f(i_0+1)$

k_1=a constant between 0 and 0.5

$$I=i_0-\frac{1}{2}+\{f(i_0-1)-f(i_0)\}/C \quad (2)$$

where,

$C=2\{D_1+K_1(D_1-D_2)\}$

$D_1=f(i_0+1)-f(i_0)$

$D_2=f(i_0-2)-f(i_01)$

K_1=a constant between 0 and 0.5

means for comparing said function value $f(i_0-1)$ with said function value $f(i_0+1)$ to judge whether

(a) $f(i_0-1)>f(i_0+1)$,

(b) $f(i_0-1)=f(i_0+1)$, or

(c) $f(i_0-1)<f(i_0+1)$; and

means for obtaining said amount I given by said formula (1) in the case of (a), or given by $I=i_0$ in the case of (b), or given by said formula (2) in the case of (c).

4,883,952

OPTICAL BIREFRINGMENT PARAMETER MEASURING SENSOR

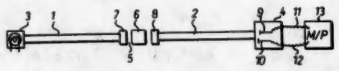
Gordon R. Jones, 17 Brimstage Close, Heswall, Merseyside, England

Filed Mar. 15, 1988, Ser. No. 168,449

Claims priority, application United Kingdom, Mar. 17, 1987, 8706318

Int. Cl.[4] G02F *1/01*

U.S. Cl. 250—225 **11 Claims**



1. Apparatus for measuring a parameter comprising a polychromatic light source; a detector disposed such that polychromatic light is propagated along a path from the source to the detector, the detector comprising at least first and second photo-responsive elements, the responsivity with respect to wavelengths of the first element being different from that of the second; first and second polarizers longitudinally spaced one from the other in the said path and oriented such that the polarization axis of the first polarizer is substantially orthogonal to that of the second; a modulating element of birefringent material disposed in the path between the first and second polarizers such that a change in the parameter to be measured causes a change in the optical path length of the polychromatic light through the modulating element, and hence a change in the color of the light incident on the detector; analysis means for calculating the color of the polychromatic light incident on the detector as represented by two or more parameters on the Chromaticity (CIE) Diagram, and means for supplying signals from the photo-responsive elements to the analysis means.

4,883,953

SPECTROSCOPIC METHOD AND APPARATUS FOR MEASURING SUGAR CONCENTRATIONS

Katsue Koashi, Toyonaka, and Hiroshi Yokota, Sakai, both of Japan, assignors to Kurashiki Boseki Kabushiki Kaisha, Okayama, Japan

Filed Nov. 1, 1988, Ser. No. 267,109

Claims priority, application Japan, Nov. 17, 1987, 62-290821

Int. Cl.[4] G01J *3/50*

U.S. Cl. 250—226 **5 Claims**

1. A spectroscopic method for measuring concentrations of sugars in samples, which comprises

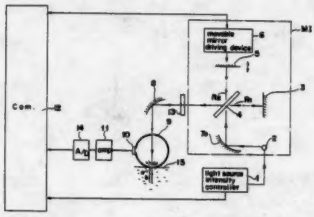
a first step wherein light intensity of a light source in an interferometer is set at a first prescribed value and outcoming light beams from said interferometer are emitted

into an integrating sphere to irradiate a sample placed at a sample aperture of said integrating sphere,

a second step wherein diffusely reflected light beams from said sample are detected by a photo detector,

a third step wherein absorption spectrum of the sugar under measurement at a first depth in said sample is determined by processing electrical signals from said photo detector by a computer,

a fourth step wherein the light intensity of the light source in said interferometer is set at a second prescribed value and absorption spectrum of the sugar under measurement at a second depth in said sample is determined in the same manner as in said first, second and third steps, and



a fifth step wherein absorption spectrum of the sugar under measurement at a deeper region between said first and second depths in the sample is determined on the basis of the difference between the respective absorption spectrum determined in said third and fourth steps so that the concentration of the sugar under measurement in said deeper region in said sample can be determined on the basis of said absorption spectrum at said deeper region,

the wavelengths for a use for said absorption spectrum being selected from a wavelength band of from 950 to 1,150 nm, from 1,150 to 1,300 nm, or from 1,300 to 1,450 nm.

4,883,954

METHOD OF MEASURING OPTICAL RADIATION ENERGY REFLECTED BY A REFLECTION AREA

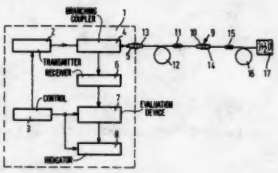
Hildegard Esser, Birreshorner Strasse 55, 5000 Köln 41, and Ulrich Grzesik, August Kierspel Str. 161, 5060 Bergisch Gladbach, both of Fed. Rep. of Germany

Filed Jun. 29, 1988, Ser. No. 212,812

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1987, 3721823

Int. Cl.[4] H01J *5/16*

U.S. Cl. 250—227 **8 Claims**



1. A method of measuring the optical radiation energy reflected by a reflection place in an optical path as a relative fraction of energy coupled to said path by an optical transmitter, comprising arranging a reflection element having a known reflection factor in the optical path that includes the reflection place; transmitting radiation along said optical path; measuring the optical power backscattered from said reflection place and from said reflection element; and determining the energy reflected from the reflection place from the optical power backscattered from the reflection place and from the reflecting element.

4,883,955

OPTICAL ENCODER WITH CONVERGING MEANS

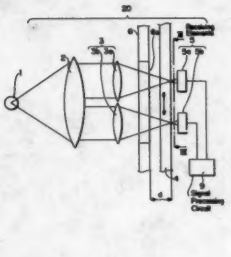
Harumi Kawasaki, and Masato Hara, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Feb. 25, 1988, Ser. No. 160,320

Claims priority, application Japan, Feb. 25, 1987, 62-42109

Int. Cl.[4] G01D *5/34*

U.S. Cl. 250—231 SE **10 Claims**



1. An optical encoder comprising:

a measuring section which comprises:

parallel light beam generating means,

light receiving means located in opposition to said parallel light beam generating means,

converging means disposed between said parallel light beam generating means and said light receiving means for converging the parallel light beam to a focal point on a focal plane, and

main grating means arranged between said converging means and said light receiving means; and

scanning grating means located between said main grating means and said light receiving means and on the focal plane of said converging means said scanning grating means being movable relative to said measuring section

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4,883,956

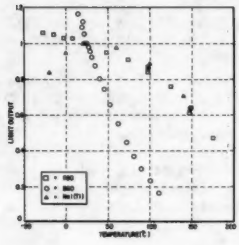
METHODS AND APPARATUS FOR GAMMA-RAY SPECTROSCOPY AND LIKE MEASUREMENTS

Charles L. Melcher, West Redding; Ralph A. Manente, Monroe, and Jeffrey S. Schweitzer, Ridgefield, all of Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 812,220, Dec. 23, 1985. This application Feb. 2, 1988, Ser. No. 149,953

Int. Cl.[4] G01T *1/202*

U.S. Cl. 250—269 **28 Claims**



1. Apparatus for investigation of subsurface earth formations, comprising:

a sonde adapted for movement through a borehole;

detector means carried by said sonde for detecting radiation and including a gadolinium orthosilicate scintillator; and

means coupled to said detector means for generating and recording a signal representative of at least one characteristic of radiation detected by said detector means.

4,883,957

MASS SPECTROMETER INCLUDING COOLING FOR THE ION COLLECTION AMPLIFIERS

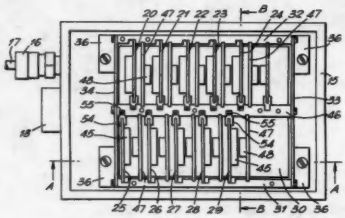
Nigel Kinge, Sandbach; Neil E. Sanderson, Sandiway, and David J. Mills, Northwich, all of England, assignors to VG Instruments Group Limited, Crawley, England

Filed Apr. 8, 1988, Ser. No. 179,426

Claims priority, application United Kingdom, Apr. 9, 1987, 8708502

Int. Cl.[4] H01J *49/00*

U.S. Cl. 250—283 **21 Claims**



1. An apparatus comprising a mass spectrometer including at least one ion-collecting means disposed to receive ions subsequent to their mass analysis and produce an electrical current substantially proportional to the number of ions striking said at least one ion-collecting means, the improvement comprising at least one current amplifier means for amplifying the electrical current produced by said at least one ion-collecting means, said at least one current amplifier means being disposed in a substantially sealed housing and comprising a plurality of electronic components, at least one of said components being an amplifying element; means for maintaining the pressure within said substantially sealed housing substantially below atmospheric pressure; means for cooling at least said amplifying element to a temperature substantially below 20° C.; and means for maintaining substantially constant the temperature of at least one of said electronic components.

4,883,958

INTERFACE FOR COUPLING LIQUID CHROMATOGRAPHY TO SOLID OR GAS PHASE DETECTORS

Marvin L. Vestal, Houston, Tex., assignor to 501 Vestec Corporation, Houston, Tex.

Filed Dec. 16, 1988, Ser. No. 285,516

Int. Cl.[4] H01J *41/04*

U.S. Cl. 250—288 **54 Claims**

1. An improved interface for receiving liquid effluent including sample solute of interest and solvent from a liquid chromatographic device and outputting sample particles of interest to a detector for analysis of a sample, the interface comprising:

a desolvation chamber;

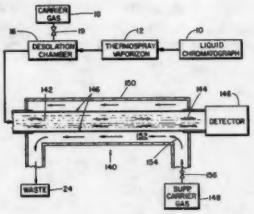
desolvation chamber heating means for heating the sprayed effluent within the desolvation chamber to vaporize substantially all solvent within the desolvation chamber while maintaining the sample particles of interest in the desolvation chamber;

spraying means for discharging the heated liquid effluent into the desolvation chamber;

gas supply means for inputting a carrier gas to the desolvation chamber;

flow path means for transferring an aerosol including the carrier gas, vaporized solvent, and the sample particles of interest from the desolvation chamber; and

solvent removal means for receiving the aerosol and removing substantially all of the vaporized solvent while outputting the carrier gas and substantially all of the sample particles of interest to the detector for analysis, the solvent removal means including a cell housing, a gas diffusion membrane within the cell housing and separating the cell



housing into a primary flow chamber for receiving the aerosol and an adjoining secondary flow chamber and supplemental carrier gas supply means for passing carrier gas through the secondary flow chamber while aerosol is passed through the primary flow chamber such that solvent vapor is diffused through the membrane from the primary flow chamber to the secondary flow chamber and is removed by the supplemental carrier gas.

4,883,959

SCANNING SURFACE MICROSCOPE USING A MICRO-BALANCE DEVICE FOR HOLDING A PROBE-TIP

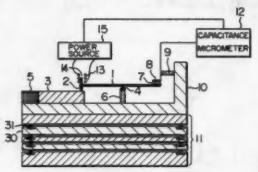
Shigeyuki Hosoki, Hachioji; Sumio Hosaka, Tokyo, and Keiji Takata, Tokorozawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 1, 1988, Ser. No. 200,979

Claims priority, application Japan, Jun. 5, 1987, 62-139712

Int. Cl.[4] G01N *23/00*

U.S. Cl. 250—306 **6 Claims**



1. A scanning surface microscope comprising:

a probe-tip;

means for positioning a sample in proximity to the probe-tip;

means for changing the relative position of the probe-tip and a surface of the sample;

a micro-balance means including a balance bar balanced about a fulcrum for holding the probe-tip and for converting irregularities of the surface of the sample into the displacement of the balance bar by utilizing a force generated between the probe-tip and the surface of the sample; and

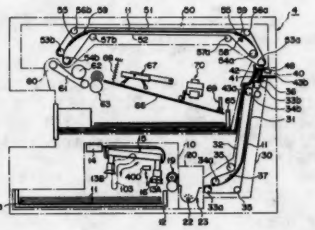
detection means for detecting the displacement of the balance bar.

4,883,960

RADIATION-TYPE DIAGNOSIS APPARATUS

Shinichiro Futamata, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 15, 1988, Ser. No. 219,341
Claims priority, application Japan, Jul. 16, 1987, 62-177405
Int. Cl.[4] G03C 5/16
U.S. Cl. 250—327.2 8 Claims



1. A radiation-type diagnosis apparatus wherein a recording sheet is used for receiving the radiation passing through a region of interest of an object and photographing the image of this region, along with a bar code identifying the recording sheet, said diagnosis apparatus comprising:

radiation-generating means for generating radiation;

support means for supporting a subject and defining a recording region;

first storage means for storing a number of recording sheets;

sheet-supplying means for supplying said recording sheets, one by one, from said the first storage means to said recording region;

second storage means for storing the recording sheets exposed to the radiation in said recording region;

bar code-reading means located within said second storage means, for reading data from the bar code provided on each of the recording sheets; and

position-detecting means incorporated within said first storage means, for detecting the presence or absence of a bar code on each recording sheet stored in said first storage means, thereby to determine whether or not the recording sheet is positioned correctly in said first storage means,

wherein the recording sheet held in said recording region is exposed to the radiation passing through a region of interest of the object, an image of the region of interest is thereby photographed on the recording sheet, the recording sheet is scanned with a light beam, thereby reproducing the image of the region of interest, and the reproduced image and the data read from the bar code are used in diagnosing the region of interest.

4,883,961

RADIATION IMAGE RECORDING AND READ-OUT APPARATUS

Satoshi Arakawa; Yuichi Hosoi; Kenji Takahashi; Kaoru Tamura, and Shigeru Satome, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

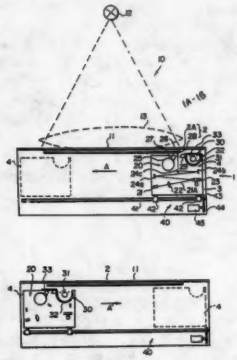
Filed Jan. 19, 1988, Ser. No. 145,180
Claims priority, application Japan, Jan. 16, 1987, 62-8571; Feb. 2, 1987, 62-21957; Apr. 17, 1987, 62-94548; Sep. 9, 1987, 62-226174; Oct. 5, 1987, 62-251268; Oct. 14, 1987, 62-259115
Int. Cl.[4] G01N 23/04
U.S. Cl. 250—327.2 20 Claims

1. A radiation image recording and read-out apparatus comprising:

(i) a stimulable phosphor sheet,

(ii) an image recording means for exposing said stimulable phosphor sheet to a radiation passing through an object, thereby to store a radiation image of said object on said stimulable phosphor sheet,

(iii) a read-out and erasing unit comprising, formed integrally with each other into a unit: (a) an image read-out means provided with a stimulating ray scanning means for scanning said stimulable phosphor sheet carrying said radiation image stored thereon by stimulating rays deflected by a light deflector, and a photoelectric read-out means for photoelectrically detecting light emitted by said stimulable phosphor sheet in proportion to the stored radiation energy at a position of scanning by said stimulating rays, thereby to read out said radiation image, and (b) an erasing means for carrying out erasing by releasing radiation energy remaining on said stimulable phosphor sheet on which the image read-out has been finished, and



(iv) a unit movement means for reciprocally moving said read-out and erasing unit in a direction approximately normal to the direction of scanning of said stimulating rays,

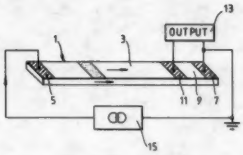
wherein said stimulable phosphor sheet is held at an image recording position facing said image recording means, said read-out and erasing unit is reciprocally moved to face said stimulable phosphor sheet held at said image recording position, carries out the image read-out by said image read-out means in the course of forward movement, and carries out the erasing by said erasing means in the course of backward movement.

4,883,962

THERMAL IMAGING DEVICES

Charles T. Elliott, Malvern, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Continuation-in-part of Ser. No. 178,556, Jul. 29, 1980. This application Jun. 23, 1981, Ser. No. 276,202
Claims priority, application United Kingdom, Jul. 30, 1979, 7926455; Jul. 11, 1980, 8022750
Int. Cl.[4] G01T 1/22; G02B 26/10
U.S. Cl. 250—334 10 Claims



1. A thermal imaging system of the kind comprising:

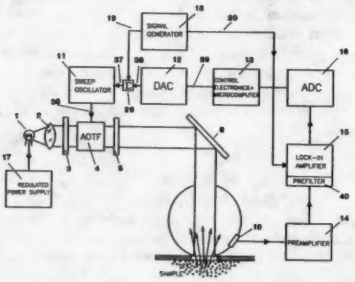
A photoconductive detector including:
at least one elongate detector element;
an input bias contact to each element;
an output bias contact to each element spaced from the corresponding input bias contact; and,
a read-out region for each element, located between the input bias contact and the output bias contact;
biassing means connected across the detector;
at least one read-out circuit, one connected to each read-out region;
an optical assembly for focussing an image of a thermal scene on to the surface of the detector; and,
a scan mechanism for scanning the image along the length of each detector element;
wherein for appropriate scan velocity and bias, photocarriers generated in each element are caused to drift along each element towards the read-out region at an ambipolar drift velocity that is matched to the scan velocity;
wherein the improvement is characterised by detector material of relatively short photocarrier lifetime; and a spacing between each input bias contact and the corresponding read-out region of each detector element such that for the appropriate scan velocity and bias, the time taken to scan the distance between each input bias contact and the corresponding read-out region is greater than the photocarrier lifetime.

4,883,963

OPTICAL ANALYSIS METHOD AND APPARATUS HAVING PROGRAMMABLE RAPID RANDOM WAVELENGTH ACCESS

Gabor J. Kemeny, and David L. Wetzel, both of Manhattan, Kans., assignors to Bran+Luebbe GmbH, Norderstedt, Fed. Rep. of Germany

Filed Apr. 28, 1986, Ser. No. 856,289
Int. Cl.[4] G01J *3/42*; G01N *21/35*
U.S. Cl. 250—339 **17 Claims**



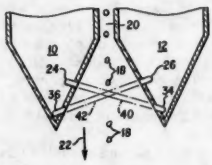
1. An apparatus for providing rapid random wavelength access for optical analysis of a sample comprising,
(a) a light source,
(b) an acousto-optic tunable filter positioned to accept light from the light source and provide emerging tuned output beams,
(c) means to select a predetermined number of tuned beams from the acousto-optic tunable filter,
(d) means to direct said predetermined number of selected tuned output beams onto the sample to be analyzed,
(e) means to collect radiation that is reflected back to transmitted through said sample,
(f) means for detecting and amplifying the reflected or transmitted radiation,
(g) electronic tunable oscillator means connected to said acousto-optic tunable filter,
(h) electronic means providing timing and logic for wavelength selection via said electronic tunable oscillator means, and
(i) means for generating a predetermined periodic signal, said electronic means providing timing and logic for wavelength selection including means for generating a non-periodic signal, means for combining the periodic signal with the non periodic signal to provide a control input signal to the electronic tunable oscillator means to permit optical analyses of at least two discrete optical qualities of said sample.

4,883,964

OPTICAL METHOD AND APPARATUS FOR DISCRIMINATING BETWEEN CROP STALKS AND WEED STALKS IN A NON-CONTACT ROW CROP HARVESTER GUIDANCE SYSTEM

Carl E. Bohman, New Holland, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Dec. 22, 1988, Ser. No. 288,359
Int. Cl.[4] A01D *75/00*; G01N *21/59*
U.S. Cl. 250—341 **6 Claims**



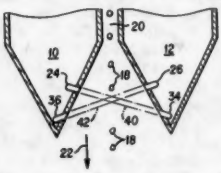
1. In a guidance system for a row crop harvesting machine operable to move along a row of crop stalks which may contain weed stalks of less width than the width of the crop stalks, a method of discriminating between crop stalks and weed stalks, said method comprising:
producing, at one side of a crop row, first and second energy beams of a given width and which cross a crop row and intersect at a crop row when the harvesting machine is aligned with the crop row, said given width being less than the width of crop stalks but greater than the width of weed stalks; and,
detecting said first and second energy beams at the other side of said crop row to determine when either of said energy beams is blocked.

4,883,965

METHOD AND APPARATUS FOR DISCRIMINATING BETWEEN STALKS AND LEAVES IN A NON-CONTACT ROW CROP HARVESTER GUIDANCE SYSTEM

Carl E. Bohman, New Holland, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Dec. 22, 1988, Ser. No. 288,360
Int. Cl.[4] A01D *75/00*; G01N *21/59*
U.S. Cl. 250—341 **5 Claims**



1. In a guidance system for a row crop harvesting machine

operable to move along a row of crop stalks, a method of discriminating between crop stalks and weeds, said method comprising:

providing first and second infra-red energy beam transmitters for producing first and second infra-red energy beams which cross a crop row and intersect at a crop row when the harvesting machine is aligned with the crop row;

providing first and second infra-red energy beam receptors for sensing said first and second infra-red energy beams, respectively; and,

energizing said first and second energy beam transmitters to produce said first and second energy beams of sufficient intensity that said first and second infra-red energy beam receptors sense said first and second infra-red energy beams through leaves but not through crop stalks wherein said first and second infra-red energy beam receptors produce output signals only when said first and second infra-red energy beams, respectively, are blocked by crop stalks.

4,883,966

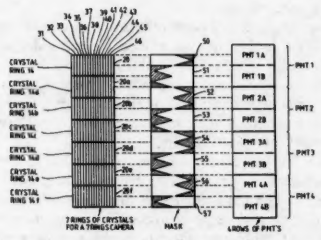
PET CAMERA WITH CRYSTAL MASKING

Wai-Hoi Wong, 7903 Deer Meadow, Houston, Tex. 77071

Filed May 5, 1988, Ser. No. 190,615

Int. Cl.[4] G01T *1/20*

U.S. Cl. 250—363.02 **2 Claims**



1. A positron emission tomography camera comprising,

a plurality of scintillation crystals in planes which are positioned side-by-side around a patient area to detect radiation therefrom and forming adjacent rows of crystals transverse to said planes,

each row of each plane having a plurality of crystals for detecting radiation,

a row of light detectors positioned adjacent each row of crystals for receiving detected radiation from the adjacent row of crystals,

a row of reflecting masks positioned between each row of crystals and each row of coacting light detectors, said masks blocking the detected radiation from each crystal in each row a different amount for providing an identification to the light detectors of which crystal detects radiation.

4,883,967

RADIATION DETECTOR AND METHOD OF MANUFACTURING THE SAME

Hiroshi Tsutsui, Yawata; Sueki Baba, Suita; Koichi Ohmori, Toyonaka; Tetsuro Ohtsuchi, Osaka, and Masanori Watanabe, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

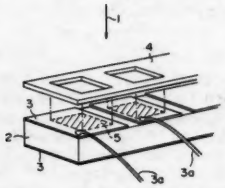
Filed May 3, 1988, Ser. No. 189,816

Claims priority, application Japan, May 26, 1987, 62-127151; Mar. 9, 1988, 63-55172

Int. Cl.[4] H01L *27/14, 31/00*

U.S. Cl. 250—370.01 **16 Claims**

1. A radiation detector comprising a radiation screening member for intercepting radiation incident upon a marginal portion of the radiation incident surface of a semiconductor radiation sensor or marginal portions of semiconductor radiation sensors in an array and boundary portions between adjacent sensors in said array, said sensor or said sensors in said



array being adapted to output pulses in correspondence with radiation photons, said sensor or said sensors in said array having an effective sensing area, and said radiation screening member having an opening area which is smaller than said effective sensing area.

4,883,968

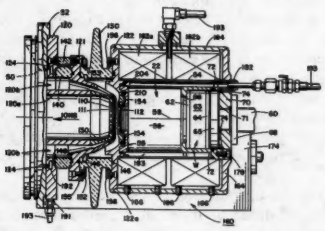
ELECTRON CYCLOTRON RESONANCE ION SOURCE

James E. Hipple, Lexington; Gerald L. Dionne, South Hamilton, both of Mass.; Yasuhiro Torii, Atsugi, Japan; Masaru Shimada, and Iwao Watanabe, both of Ishida, Japan, assignors to Eaton Corporation, Cleveland, Ohio and Nippon Telegraph and Telephone Corporation, Kanagawa, Japan

Filed Jun. 3, 1988, Ser. No. 202,141

Int. Cl.[4] H01J *37/08*

U.S. Cl. 250—423 R **15 Claims**



1. A microwave energized ion source comprising:

(a) structure defining a cylindrical ion producing chamber having a longitudinal axis and a gas inlet for supplying an oinizable gas in controlled concentrations into the chamber, said structure including an ion beam exit opening at one end of said chamber and an energy input opening at an opposite end of said chamber;

(b) magnetic field defining structure comprising one or more annular coils supported along the length of the ion producing chamber which, when energized provides a generally axially aligned magnetic field in the ion producing chamber, said magnetic field defining structure having an outer, coil enclosing structure comprising magnetically permeable material for shaping the magnetic field generated by coil energization;

(c) ion accelerating structure including inner, intermediate and outer spaced aperture plates covering the exit opening and having aligned openings providing exit paths for ions exiting the chamber, said outer aperture plate constructed from a more magnetically permeable material than the inner and intermediate spaced aperture plates for extend-

ing a region of axial magnetic field alignment through said inner and intermediate spaced aperture plates; and

(d) structure for exciting ionizing electrons in the chamber by application of microwave frequency energy to the chamber, said structure including one or more microwave transmitting elements supported at the energy input opening of said ion producing chamber.

4,883,969

METHOD OF IONIZING GAS WITHIN CATHODE-CONTAINING CHAMBER

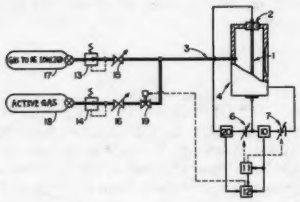
Yoshihiro Ishida, Kawaguchi; Akira Yoshida, Urawa, and Hideo Kobayashi, Tokyo, all of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 82,604, Aug. 6, 1987, abandoned. This application Feb. 21, 1989, Ser. No. 314,330

Claims priority, application Japan, Aug. 13, 1986, 61-189994

Int. Cl.[4] H01J *27/00*

U.S. Cl. 250—427 **14 Claims**



1. A method of ionizing a gas within a chamber having a cathode disposed therein, wherein the sputtering effect upon the cathode is substantially reduced to prolong the life of the cathode, said method comprising:

activating the cathode to emit thermal electrons therefrom within the chamber by applying a voltage thereto;

introducing a gas to be ionized into the chamber having the cathode therein;

introducing at least one active gas into the chamber having the cathode therein;

ionizing the gas to be ionized by subjecting the gas to be ionized to the thermal electrons emitted by the cathode; and

controlling the introduction of said at least one active gas into the chamber to maintain a predetermined mixture ratio with the gas to be ionized within the chamber to induce growth in the volume of the cathode at least partially offsetting the removal of atoms from the cathode caused by the sputtering effect.

4,883,970

X-RAY INTENSIFYING SCREENS CONTAINING ACTIVATED RARE EARTH BORATES

Catherine J. Page, Eugene, Oreg., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 95,229, Sep. 11, 1987, which is a continuation-in-part of Ser. No. 897,040, Aug. 15, 1986, abandoned. This application Dec. 14, 1988, Ser. No. 284,424

Int. Cl.[4] C09K *11/78*; H01J *1/63*

U.S. Cl. 250—483.1 **7 Claims**

1. An X-ray intensifying screen comprising a flexible support, particles of an X-ray phosphor on the support, and a binder for said phosphor particles, wherein the X-ray phosphor consists essentially of

$$Gd_{1-x}BO_3:Ce_x$$

wherein X is 0.001 to 0.09.

4,883,971

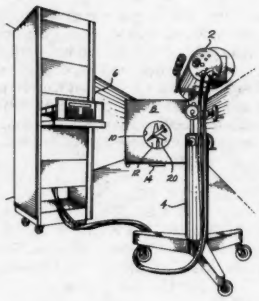
METHOD AND APPARATUS FOR DETERMINING INFRARED SIGNATURE OF OBJECTS

David G. Jensen, Auburn, Wash., assignor to The Boenig Company, Seattle, Wash.

Filed Dec. 19, 1988, Ser. No. 286,628

Int. Cl.[4] H01K *1/14*

U.S. Cl. 250—495.1 **37 Claims**



1. A device for simulating the infrared signature of an object, said device comprising:

a plurality of layers of fiber reinforced composite material, said layers including two adjacent electrically insulative layers; and

an elongated conductor interposed between said two layers and connectable to an electric power source, said conductor being arranged in a continuous winding pattern having a plurality of spaced regions;

wherein all of said layers are bonded together to form, with the conductor, an integral structure; said structure is shaped to simulate the three dimensional shape of the object; and said regions are sufficiently close to each other, and said conductor is positioned at a sufficient depth relative to an outer surface of said structure, to produce a substantially continuous temperature gradient on said outer surface when the conductor is heated by supplying electric power thereto.

4,883,972

MONITORING EQUIPMENT FOR DETECTION OF EMISSION

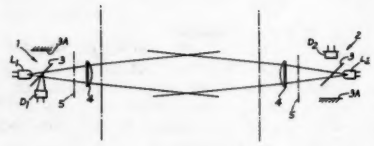
Charles D. Coe, Chesterfield, England, assignor to Combustion Developments Limited, Derbyshire, England

Filed May 6, 1988, Ser. No. 190,757

Claims priority, application United Kingdom, May 13, 1987, 8711309

Int. Cl.[4] G01N *21/00, 21/49*

U.S. Cl. 250—575 **11 Claims**



1. Monitoring equipment for smoke and/or fine particulate emissions in which light from a light source is transmitted across a flue to a detector, comprising two units for location to opposite sides of a flue or chimney, each unit comprising a light source, a lens and a light detector, the light from the light source of each said unit being directed by its lens across the

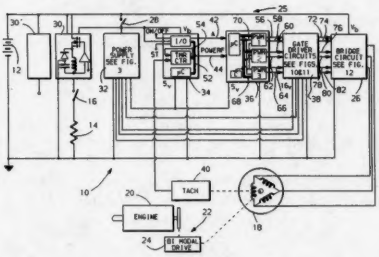
flue or chimney in a divergence path, to be gathered by the lens of the opposite unit and directed to the detector in the opposite unit, and there being means in each unit to direct light from said light source to said respective detector, and means for combining the outputs from the detectors of each unit to provide a resulting composite reading of the degree of smoke and/or fine particulate material existing in the flue or chimney.

4,883,973

AUTOMOTIVE ELECTRICAL SYSTEM HAVING A STARTER/GENERATOR INDUCTION MACHINE

Leroy E. Lakey, Anderson; David A. Peter, Alexandria; David A. Chance, Noblesville, and Stephen W. Anderson, Anderson, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 1, 1988, Ser. No. 227,036
Int. Cl.[4] F02N *11/04*
U.S. Cl. 290—31 **5 Claims**



1. A motor vehicle electrical system for starting an internal combustion engine and generating electricity for charging a vehicle storage battery and energizing vehicle electrical loads, comprising in combination:

an induction machine coupled to the engine for bi-directional rotary mechanical energy exchange;

bi-directional bridge circuit means electrically coupling the storage battery and the induction machine for bi-directional electrical energy exchange;

control means for controlling the operation of said bridge circuit means (1) in an engine starting mode to operate said bridge as an inverter for energizing said induction machine with substantially sinusoidal voltage derived from the storage battery, and (2) in a generating mode to operate said bridge as a converter for drawing energy from the induction machine for charging the storage battery; and

load converter means coupled between the storage battery and the electrical loads for drawing current from said storage battery at a predefined load voltage for energizing said electrical loads.

4,883,974

VEHICULAR DOOR MULTIPLEXING SYSTEM

David V. Tinder, Dearborn, Mich., assignor to United Technologies Automotive, Inc., Dearborn, Mich.

Filed May 6, 1988, Ser. No. 191,097
Int. Cl.[4] H02J *1/00*
U.S. Cl. 307—10.1 **2 Claims**

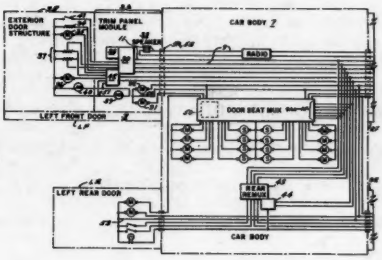
1. A vehicle having a main body, a main DC power source contained in the body, at least one door movably attached to the body of the vehicle to open and close with an attachment gap between them, a number of electrical components in the door with the electrical components powered by the main DC power source, comprising:

at least one relatively low power DC electrical component and at least one relatively high power DC electrical component in the door;

a main multiplexing unit located in the main vehicle body;

a remote multiplexing unit electrically connected to said main multiplexing unit but located in the door, the two multiplexing units being electrically connected together by wiring extending across the hinge gap; and

a low power control unit also located in the door associated with and controlled by said remote multiplexing unit, the



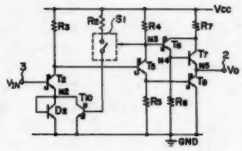
DC power from the main DC power source to the low power unit being directly supplied through said low power control unit in the door through wiring totally contained in the door, while the DC power from the main power source to the high power unit is directly supplied from said main multiplexing unit in the vehicle body through the wiring extending across the attachment gap.

4,883,975

SCHMITT TRIGGER CIRCUIT

Hiromu Enomoto, Sendai; Hirofumi Dohgome, Kokubu; Masao Kumagai, Sendai; Toru Nakamura, Kushikino, and Kimitaka Yoshiyama, Kagoshima, all of Japan, assignors to Fujitsu Limited, Kawasaki and Kyushu Fujitsu Electronics Limited, Kagoshima, both of, Japan

Filed Nov. 8, 1988, Ser. No. 268,880
Claims priority, application Japan, Nov. 17, 1987, 62-290177
Int. Cl.[4] H03K *3/29, 5/153, 5/00, 5/12*
U.S. Cl. 307—290 **20 Claims**



1. A Schmitt trigger circuit for outputting an output voltage having a logic level which changes from a low level to a high level at a first threshold value of an input voltage and which changes from the high level to the low level at a second threshold value of the input voltage, said Schmitt trigger circuit comprising:

a first transistor for inversion having a base supplied with the input voltage and having an emitter voltage;

a level shift diode, coupled to said first transistor, for shifting the emitter voltage of said first transistor from a reference level, said level shift diode having an anode and a cathode;

a second transistor for switching, having a collector and an emitter respectively coupled to the anode and the cathode of said level shift diode, the emitter of said second transistor being coupled to a first power source voltage, said second transistor having a base;

switching means for controlling switching of said second

transistor, said switching means being coupled between the base of said second transistor and a second power source voltage higher than the first power source voltage; and

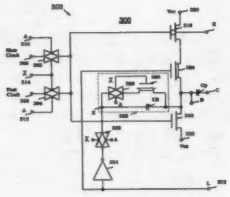
an output circuit, coupled to said first transistor and supplied with the input voltage through said first transistor, for outputting the output voltage, said output circuit being coupled between the first and second power source voltages, said switching means being controlled responsive to the output voltage from said output circuit so as to close when the logic level of the output voltage is the high level, thereby turning said second transistor ON.

4,883,976

LOW POWER DUAL-MODE CMOS BIAS VOLTAGE GENERATOR

Peter Deane, Sunnyvale, Calif., assignor to Xicor, Inc., Milpitas, Calif.

Filed Dec. 2, 1987, Ser. No. 127,934
Int. Cl.[4] H03K *3/01, 19/003, 19/096*
U.S. Cl. 307—291.2 **8 Claims**



1. An improved bias voltage generator for generating an output voltage having an opposite polarity than a power source input voltage comprising:

(a) a first receiving means for receiving a first clock signal;

(b) first charge pump means coupled to said power source and said first receiving means including a first charge pump capacitor having a charge pump side and an output side wherein said first charge pump means is responsive to said first clock signal for alternatively switching the charge pump side of said first charge pump capacitor between first and second voltages;

(c) clamping means coupled to said first receiving means and said first charge pump means and responsive to said first clock signal for clamping the output side of said first charge pump capacitor to approximately zero volts when said charge pump side of said first charge pump capacitor is switched to said first voltage such that charge is coupled from said power source to said first charge pump capacitor and for unclamping the output side of said first charge pump capacitor when said charge pump side of said first charge pump capacitor is switched to said second voltage; and

(d) output means coupled to the output side of said first charge pump capacitor for coupling the energy stored on said first charge pump capacitor to a load whenever said output side of said first charge pump capacitor is unclamped by said clamping means.

4,883,977

MAGNETIC POWER CONVERTER

Dennis J. Regan, 318 E. 18th St., Bakersfield, Calif. 93305

Filed Jul. 6, 1987, Ser. No. 69,633
Int. Cl.[4] H01F *27/42*
U.S. Cl. 307—401 **9 Claims**

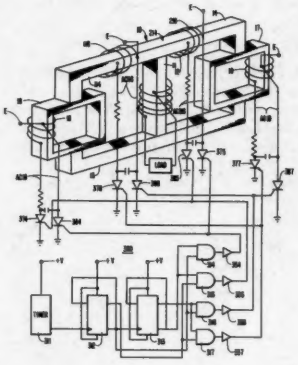
5. A magnetic circuit comprising:

a ferromagnetic core piece having an upper and a lower end;

an upper and a lower ferromagnetic transverse piece respectively aligned in magnetic proximity adjacent said upper and lower ends of said core piece;

a closed ferromagnetic loop fixed between said upper and lower transverse pieces;

a reverse winding affixed on said closed loop;



a forward winding affixed to said upper transverse piece; and

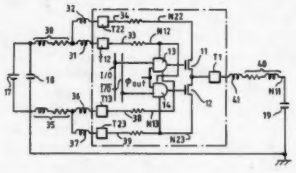
switching means for alternatively applying electrical excitations to said reverse and forward windings.

4,883,978

SEMICONDUCTOR DEVICE HAVING REDUCED POTENTIAL FLUCTUATIONS

Shigeo Ohshima, and Hiroshi Sahara, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 11, 1988, Ser. No. 167,082
Claims priority, application Japan, Mar. 23, 1987, 62-68254
Int. Cl.[4] H03K *17/16*
U.S. Cl. 307—443 **6 Claims**



1. A semiconductor device including a semiconductor integrated circuit having a plurality of circuit components, said device comprising:

first and second power source pads coupled to the high potential side of an external power source by means of respective wirings;

first and second reference pads coupled to the reference potential side of said external power source by means of respective wirings;

a data output buffer having a data output terminal comprising first and second transistors coupled in series between the first power source pad and the first reference pad for supplying an output signal in response to a signal supplied by the semiconductor integrated circuit; and

first and second gate circuits, each gate circuit associated with a respective one of said first and second series connected transistors for generating a signal to control the switching of the corresponding transistor, said gate circuits being circuit components of said semiconductor

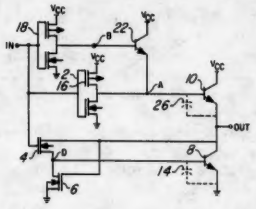
integrated circuit, said first gate circuit coupled between said second power source pad and said first reference pad, said second gate circuit and remaining circuit components coupled between said second power source pad and said second reference pad.

4,883,979

DARLINGTON BICMOS DRIVER CIRCUIT

Hiep V. Tran, Carrollton, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 158,004, Feb. 16, 1988, Pat. No. 4,794,280. This application Nov. 14, 1988, Ser. No. 272,145
The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.
Int. Cl.[4] H03K *19/02, 3/26, 17/60, 17/687*
U.S. Cl. 307—446 8 Claims



TIMING DIAGRAM

1. A BiCMOS driver circuit comprising:
a first CMOS inverter;
a first bipolar transistor connected to the output of said first CMOS inverter;
a second bipolar transistor connected to the base of said first bipolar transistor;
a second MOS inverter connected to the base of said second bipolar transistor;
voltage pull-down circuitry connected to the output of said first bipolar transistor.

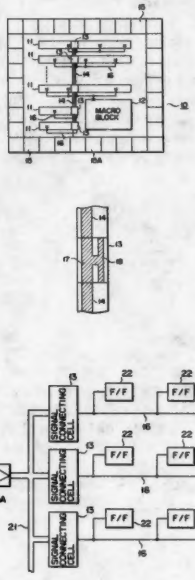
4,883,980

SEMICONDUCTOR IC (INTEGRATED CIRCUIT) DEVICE

Toshiki Morimoto, Kawasaki, and Seiji Watanabe, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 26, 1988, Ser. No. 238,229
Claims priority, application Japan, Aug. 27, 1987, 62-213545
Int. Cl.[4] H01L *27/10, 23/50, 23/52;* H03K *3/01*
U.S. Cl. 307—465.1 5 Claims

1. A semiconductor integrated circuit device comprising:
a plurality of cell rows each including a plurality of standard cells;
signal connection cells provided one at each of said cell rows and located on a straight line perpendicular to the respective cell rows;
a connection line for cell rows which is connected to the signal connection cells to allow a signal which is propagated via the signal connection cell to be supplied to the cell in the cell row; and



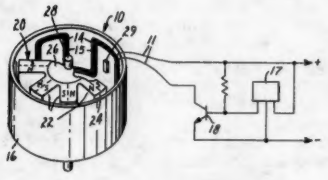
cell-to-cell connection lines each connected between the signal connection cells and having a greater width than that of an ordinary connection line.

4,883,981

DYNAMOELECTRIC MACHINE HAVING IRONLESS STATOR COIL

Sten R. Gerfast, 1802 Valley Curve Rd., Mendota Heights, Minn. 55118

Continuation-in-part of Ser. No. 870,432, Jun. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. 660,524, Oct. 12, 1984, abandoned. This application Aug. 5, 1988, Ser. No. 229,137
Int. Cl.[4] H02K *1/22*
U.S. Cl. 310—40 R 17 Claims



1. A dynamoelectric machine comprising
(1) a rotor comprising alternating N and S poles having working faces of equal length and equal angular width and
(2) a brushless, substantially ironless stator comprising
(a) a continuous electrical conductor having two free ends, which conductor is grouped into compact bundles that are spaced from each other and closely spaced from

the working faces of the rotor, each bundle (i) containing at least four layers of the conductor, (ii) being coextensive with said length of the working faces of the rotor, and (iii) being directly opposed to an N pole of the rotor when an adjacent bundle is directly opposed to an S pole of the rotor, and

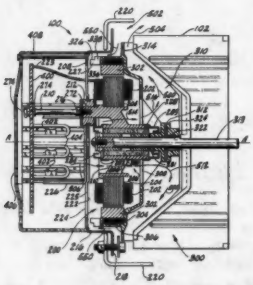
(b) means for connecting said free ends into a circuit such that at any instant current can flow through portions of the conductor within each bundle in the same direction, which direction is opposite to current flowing through portions of the conductor within each adjacent bundle, and electromagnetic flux associated with that current directly interacts with flux of the rotor.

4,883,982

ELECTRONICALLY COMMUTATED MOTOR, BLOWER INTEGRAL THEREWITH, AND STATIONARY AND ROTATABLE ASSEMBLIES THEREFOR

Franklin L. Forbes, LaOtto, and Eldon R. Cunningham, Fort Wayne, both of Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed Jun. 2, 1988, Ser. No. 201,681
Int. Cl.[4] H02K *9/00*
U.S. Cl. 310—62 **40 Claims**



1. A motor assembly comprising:

a support member adapted to be mounted on a stationary support for supporting said motor assembly and having a first side and a second side opposite the first side, said support member having at least one opening therein adapted to permit airflow therethrough;

a stationary assembly mounted on the first side of said support member and having a plurality of winding stages adapted to be electrically energized to generate an electromagnetic field;

an annular rotatable assembly on the first side of said support member and including a plurality of permanent magnetic elements surrounding said stationary assembly;

control means, connected to the winding stages and mounted on the second side of said support member, for applying a voltage to one or more of the winding stages at a time and for commutating the winding stages in a preselected sequence to rotate the rotatable assembly; and

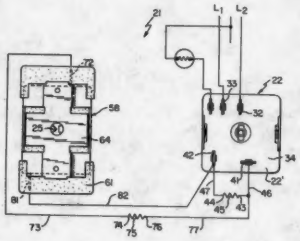
impeller means on said rotatable assembly for moving air in heat exchange relationship with said control means and through the opening in said support member.

4,883,983

SWITCHING SYSTEM FOR PLURAL LOAD CIRCUIT

David T. Llewellyn, Ebensburg, and William J. Lichtenberger, Murrysville, both of Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Jul. 8, 1988, Ser. No. 216,801
Int. Cl.[4] H02B *1/24;* **H01H** *19/42;* **H05B** *3/02*
U.S. Cl. 307—112 **18 Claims**



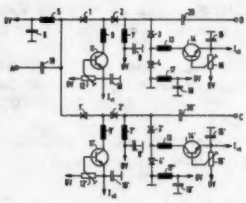
10. In a system comprising a first load means, an electrical power source, and a cyclable electrical switch construction operatively interconnected to said first load means and said source, said cyclable electrical switch construction comprising a housing means having a cyclable electrical switch means disposed completely therein and a rotatable actuator shaft that extends from said housing means for setting the duty cycle of said switch means for interconnecting said source to said first load means in relation to the rotational position of said shaft in either rotational direction thereof from an "off" position thereof, the improvement comprising an electrical switch unit carried on said housing means and being completely external to said housing means and separate from said switch means while having actuating means operatively interconnected with said shaft so that said switch unit is actuated from an "off" condition thereof to an "on" position there in one rotational direction thereof, and a second load means, said switch unit being operatively interconnected to said source and to said second load means to interconnect said source to said second load means only when said switch unit is in said "on" condition thereof.

4,883,984

PIN DIODE SWITCH

Helmut Kess, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,019
Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723738
Int. Cl.[4] H03K *17/74, 3/33;* **H01P** *1/10;* **H03H** *7/48*
U.S. Cl. 307—256 **3 Claims**



1. A PIN diode switch for switching radio-frequency voltages between an input and an output of the switch, said PIN

diode switch being used with a reference potential and comprising:

a series circuit consisting of first and second oppositely polarized PIN diodes, said diodes being connected at a junction and being disposed between said input and said output of said switch;

means for supplying a control current to said first and second PIN diodes at said junction including an inductor and a transistor, said control current being supplied to said junction via a series path including the collector-emitter path of said transistor and said inductor;

third and fourth PIN diodes connected in series between said output and said reference potential, said third and fourth PIN diodes being connected at a junction; and

means for supplying a control current to said junction of said third and fourth PIN diodes.

4,883,985

MESFET LATCH CIRCUIT

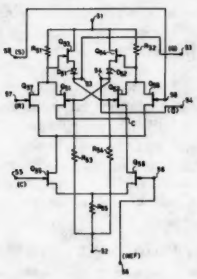
Shin Katsu, Takatsuki; Shutaro Nambu, Ibaraki, and Akio Shimano, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 821,889, Jan. 27, 1986, abandoned, which is a continuation of Ser. No. 458,023, Jan. 14, 1983, abandoned. This application Oct. 28, 1987, Ser. No. 117,367

Claims priority, application Japan, Jan. 20, 1982, 57-8119; Feb. 16, 1982, 57-23802; Feb. 16, 1982, 57-23803; May 11, 1982, 57-79349

Int. Cl.[4] H03K *3/26, 19/017*

U.S. Cl. 307—279 **11 Claims**



1. An FET circuit comprising:

a pair of inverters, each inverter comprising:

an output terminal,

resistive means,

a first FET having drain, gate and source electrodes and having its drain electrode connected through said resistive means to a first power supply terminal, its gate electrode connected to said output terminal of the other said inverter and its source electrode connected to a first common connection point, and

a second FET having drain, gate and source electrodes and having its drain electrode connected to the drain electrode of said first FET, its gate electrode connected to one of a set terminal and reset terminal and its source electrode connected to a second common connection point;

said pair of inverters comprising a third FET having drain, gate and source electrodes and having its drain electrode connected to said first common connection point and its gate electrode connected to a reference voltage terminal, and a fourth FET having drain, gate and source electrodes and having its drain electrode connected to said second common connection point, its gate electrode connected to a clock terminal and its source electrode connected to the source electrode of the third FET at a third common connection point; and

substantially constant current source means connected between said third common connection point and a second power supply terminal.

4,883,986

HIGH DENSITY SEMICONDUCTOR CIRCUIT USING CMOS TRANSISTORS

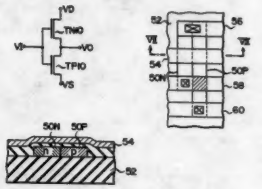
Hideharu Egawa, Tokyo, and Yasoji Suzuki, Yokosuka, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

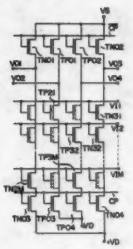
Filed May 14, 1982, Ser. No. 378,266

Claims priority, application Japan, May 19, 1981, 56-75164; May 19, 1981, 56-75176

Int. Cl.[4] H01L *27/02, 29/78, 27/12;* **H03K** *19/094*

U.S. Cl. 307—298 **13 Claims**





1. A semiconductor integrated circuit comprising:

a first terminal set at a first potential;

a second terminal set at a second potential more negative than said first potential;

input and output means;

an n-channel MOS transistor device circuit including at least one n-channel MOS transistor whose gate is connected to said input means and whose current path is connected between said first terminal and a circuit point which is coupled to said output means, said n-channel MOS circuit having a first n-channel MOS transistor whose current path is connected at one end of said circuit point, and a plurality of second n-channel MOS transistors whose current paths are connected in parallel between the other end of the current path said first n-channel MOS transistor and said first terminal; and

a p-channel MOS circuit including at least one p-channel MOS transistor whose gate is connected to said input means and whose current path is connected between said circuit point and said second terminal, said p- and n-channel MOS transistors both being enhancement types, said p-channel MOS circuit having a first p-channel MOS transistor which is connected between said circuit point and said second terminal and a plurality of second p-channel MOS transistors whose current paths are series-connected between said circuit point and said second terminal;

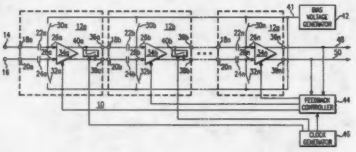
wherein the conduction state of said n-channel MOS transistor and said p-channel MOS transistor is controlled in response to an input signal supplied through said input means to set a potential at said circuit point in accordance with the conduction states of said n-channel MOS transistor and said p-channel MOS transistor.

4,883,987

COMPARATOR CIRCUIT HAVING A FAST RECOVERY TIME

John W. Fattaruso, Dallas County, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 4, 1988, Ser. No. 190,207
Int. Cl.[4] H03K *5/24*
U.S. Cl. 307—355 **9 Claims**



1. A comparator circuit having a short recovery time, said circuit comprising:

a first comarator having a first input for receipt of a first analog signal, a second input for receipt of a second analog signal, and first and second outputs which together indicate whether said first analog signal exhibits a greater amplitude than said second analog signal;

first means, having a first port coupled to said first output and a second port coupled to said second output, for selectively shorting said first and second outputs together;

a second comparator having first and second inputs and first and second outputs;

a first capacitor coupled in series between said comparator first output and said second comparator first input;

a second capacitor coupled ion series between said comparator second output and said second comparator second input;

and second means, having a first port coupled to said second comparator first output and a second port coupled to said second comparator second output, for shorting said first and second outputs of said second comparator together so as to preserve the charge on each of the first and second capacitors.

4,883,988

CURRENT MIRROR SWITCHING CIRCUIT

Akira Ide, and Yoshikazu Saito, both of Takasaki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 946,777, Dec. 29, 1986, abandoned.
This application Oct. 25, 1988, Ser. No. 262,290
Claims priority, application Japan, Dec. 27, 1985, 60-292667
Int. Cl.[4] H03K *17/16, 19/02, 19/092*
U.S. Cl. 307—443 **6 Claims**

1. A switching circuit comprising:

first and second power supply terminals for supplying first and second operating voltages, respectively, to said switching circuit;

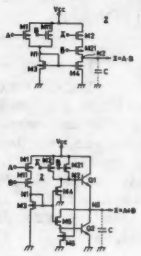
an output terminal;

at least first to fourth input terminals for respectively receiving at least first to fourth input signals, said third and fourth input signals being reversed in phase relative to said first and second input signals;

a current mirror coupled to have an input node for receiving an input current and to have an output node which is coupled to said output terminal and to said second power supply terminal, wherein said current mirror provides an output current at said output node thereof in response to a supply of said input current to said input node thereof so as to execute one of charging and discharging of an output capacitance of said output terminal;

a first switching circuit coupled between said first power supply terminal and said input node of said current mirror and for providing said input current to said current mirror, wherein said first switching circuit includes at least first and second switch elements which are driven by said first and second input signals, respectively; and

a second switching circuit coupled between said first power supply terminal and said output terminal and for executing the other of said charging and discharging of output capacitance of said output terminal, wherein said second



switching circuit includes at least third and fourth switch elements which are driven by said third and fourth input signals, respectively,

wherein said first and second switch elements are coupled in one connecting mode from among series and parallel connections between said first power supply terminal and said input node of said current mirror,

wherein said third and fourth switch elements are in another connecting mode from among series and parallel connections between said first power supply terminal and said output terminal, and

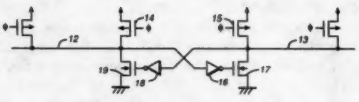
wherein said first and second switching circuits are selectively operated by said first to fourth input signals.

4,883,989

CIRCUIT FOR PRECHARGING A BUS

Toshiaki Mizukami, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 29, 1988, Ser. No. 237,872
Claims priority, application Japan, Sep. 30, 1987, 62-247666
Int. Cl.[4] H03K *19/017*
U.S. Cl. 307—448 **2 Claims**



1. A circuit for precharging a bus comprising

a first bus,

a second bus,

a first precharging MOS transistor precharging said first bus,

a second precharging MOS transistor precharging said second bus,

a first CMOS inverter,

a second CMOS inverter,

a first driving MOS transistor for driving said first bus, and

a second driving MOS transistor for driving said second bus,

said circuit being so structured that a signal inputted to said

first bus is transmitted to the gate of said second driving MOS transistor through said second CMOS inverter to thereby drive said second bus and that a signal inputted to said second bus is transmitted to the gate of said first driving MOS transistor through said first CMOS inverter to thereby drive said first bus whereby a signal inputted to either of said buses causes said first and second buses to be combined non-synchronously.

4,883,990

ECL-TTL LEVEL CONVERTER

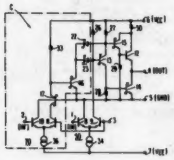
Yoshitaka Umeki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

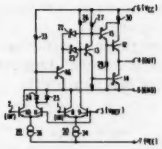
Filed Oct. 31, 1988, Ser. No. 264,555

Claims priority, application Japan, Oct. 30, 1987, 62-276604

Int. Cl.[4] H03K *19/092, 19/086, 17/10, 17/14*

U.S. Cl. 307—473 **6 Claims**





1. A signal level converter comprising:

a positive power supply line;

a ground potential line;

a negative power supply line;

a first current switching logic circuit coupled to said ground potential line and to said negative power supply line, and having first, second and third ports;

a second current switching logic circuit coupled to said ground potential line and to said negative power supply line, and having first, second and third ports;

an input terminal connected to said first port of said first current switching logic circuit;

a three-state control input terminal connected to said first port of said second current switching logic circuit;

a reference potential terminal connected to said second ports of said first and second current switching logic circuits;

a TTL circuit coupled to said positive power supply line and to said ground potential line, and including a phase-divide stage transistor, an output transistor and a off-buffer transistor, said phase-divide stage transistor having a base, a collector and an emitter;

an output terminal connected to a connecting port between said output transistor and said off-buffer transistor;

a first diode having an anode and a cathode, said anode being connected to said collector of said phase-divide stage transistor;

a second diode having an anode and a cathode, said anode being connected to said base of said phase-divide stage transistor;

a first transistor having a base, a collector and an emitter, said base being connected to said positive power supply line through a resistor, said emitter being connected to said ground potential line, and said collector being connected to said cathodes of said first and second diodes in common;

a connecting means for connecting said third port of said first current switching logic circuit to said base of said phase-divide stage transistor to send a signal from said first current switching logic circuit to said phase-divide stage transistor; and

a switching means connected to said base of said first transistor and to said third port of said second current switching logic circuit to render said first transistor in a conductive state or a nonconductive state in accordance with a signal from said second current switching logic circuit.

4,883,991

CIRCUIT ARRANGEMENT FOR ADJUSTING A REFERENCE LEVEL IN A PERIODIC SIGNAL

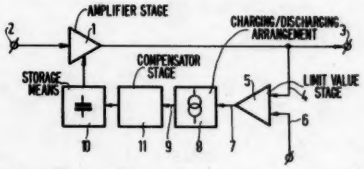
Klaus G. Kröner, Hamburg, and Jörg Wölber, Pinneberg, both of Fed. Rep. of Germany, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Jun. 4, 1987, Ser. No. 58,097

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1986, 3618939

Int. Cl.[4] H03F *1/30, 3/45;* **H03K** *17/56;* **H03L** *5/0*

U.S. Cl. 307—491 **14 Claims**



1. A circuit arrangement for controlling a reference level within a periodic signal comprising:

(a) an amplifying stage having at least one amplifier component to which said periodic signal is applied;

(b) storage means for providing a mean value substantially corresponding to said reference level, said storage means being coupled to a control input of said amplifying stage;

(c) charging and discharging means connected to said storage means, for providing charging and discharging currents to said storage means at a ratio with respect to each other which determines said mean value;

(d) limit value means connected to said charging and discharging means, for comparing the value of said periodic signal at an output of said amplifying stage with a substantially constant limit value and thereby controlling said charging and discharging means; and

(e) compensator means connected between said charging and discharging means and said storage means, for compensating for fluctuations in said ratio of charging current to discharging current.

4,883,992

TEMPERATURE COMPENSATED VOLTAGE GENERATOR

Dennis M. Koglin, Indianapolis, and Mark B. Kearney, Kokomo, both of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Sep. 6, 1988, Ser. No. 240,279

Int. Cl.[4] G01L *9/06*

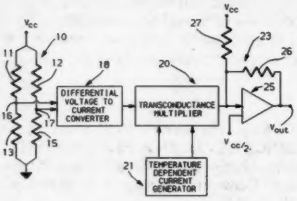
U.S. Cl. 307—491 **10 Claims**

1. A temperature compensation circuit for a device effective to generate a voltage as a function of a physical parameter but subject to a predetermined variation of the function with temperature over a predetermined temperature range, the device being characterized by a null value of the input parameter for

which the generated voltage is zero over the predetermined temperature range, the temperature compensation circuit comprising, in combination:

a voltage to current converter responsive to the generated voltage to produce a proportional current;

a current generator comprising elements responsive to the



temperature of the device to generate a pair of compensation currents varying therewith in a predetermined manner so that the ratio of the compensation currents embodies a desired temperature compensation; and

a transconductance multiplier effective to multiply the proportional current by the ratio of the compensation currents to generate a compensated output current.

4,883,993

ANTIBOUNCE CIRCUIT FOR DIGITAL CIRCUITS

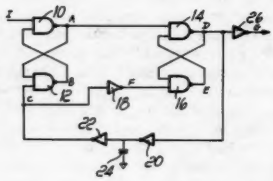
Pierangelo Confalonieri, Canonica d'Adda; Sergio Pernici, Bergamo, and Germano Nicollini, Piacenze, all of Italy, assignors to SGS-Thomson Microelectronics srl., Agrate Brianza, Italy

Filed Dec. 2, 1988, Ser. No. 279,036

Claims priority, application Italy, Dec. 14, 1987, 22987A/87

Int. Cl.[4] H03K *17/16, 19/003, 5/00*

U.S. Cl. 307—542.1 **5 Claims**



1. Antibounce circuit for digital signals, characterized in that it comprises:

(a) a first flip-flop constituted by a first and a second NAND gate (10, 12) having their respective outputs connected to one of the inputs of the other gate, the free input of the first gate being the input for said digital signal;

(b) a second flip-flop constituted by a third and a fourth NAND gate (14, 16) having their respective outputs connected to one of the inputs of said other gate, the free input of said third gate being connected to the output of said first gate;

(c) a non-inverting delay circuit (20, 22, 24) connecting the output of said third gate to the free input of said second gate;

(d) a first inverter connecting the output of said delay circuit to the free input of said fourth gate.

4,883,994

LINEAR MOTOR

Hideo Nikura, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

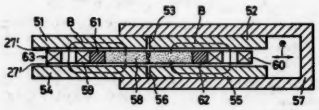
Division of Ser. No. 918,151, Oct. 14, 1986, Pat. No. 4,803,388.

This application Jan. 29, 1988, Ser. No. 149,698

Claims priority, application Japan, Oct. 28, 1985, 60-241144

Int. Cl.[4] H02K *41/00*

U.S. Cl. 310—12 **3 Claims**



1. A linear motor comprising:

a first yoke and a second yoke spaced apart the width of a first gap from each other;

a magnet spaced apart the width of a second gap from and arranged in opposed relation to said first yoke and second yoke;

a coil fixed to the end of said magnet through a nonmagnetic material;

a third yoke and a fourth yoke spaced apart the same width of a gap as that of said first gap from each other and so arranged in opposed relation to said magnet as to be spaced apart the same width of a gap as that of said second gap from said magnet; and

a member of nonmagnetic material having a substantially U-shaped section and connecting said first and second yokes to said third and fourth yokes.

4,883,995

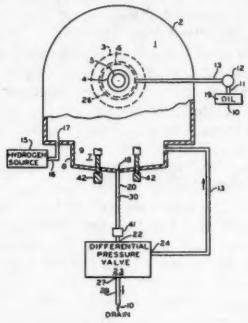
AUTOMATIC OIL DRAINING SYSTEM FOR GENERATORS

Frederick J. Rink, Jr., Danvers, Mass., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 30, 1988, Ser. No. 292,061

Int. Cl.[4] H02K *9/24, 5/136*

U.S. Cl. 310—55 **15 Claims**



1. In combination with a rotating machine such as an electric power generator having a housing containing a gas under pressure and bearings to rotatably support the shaft of the machine, an oil supply apparatus comprising;

shaft seals positioned on said shaft adjacent said bearings to maintain the gas within said machine;

means to supply oil to said seals at a pressure above that of said gas to maintain said gas within said machine housing;

a fluid drain located within said machine below said shaft

seals to enable draining of any leakage into the interior of said machine;

a differential pressure valve having a first inlet connected to said fluid drain;

a second inlet of said differential pressure valve connected to the gas pressure within said machine; and

the outlet of said differential pressure valve being connected to said first inlet upon actuation thereof, whereby fluid is released from said fluid drain through said outlet of said differential pressure valve when the differential pressure of said first inlet exceeds that of said second inlet by an amount adequate to actuate said differential pressure valve.

4,883,996

MOTOR

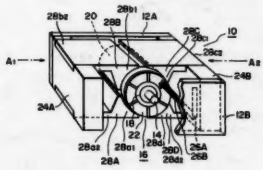
Kanemasa Aoki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha and Canon Seiki Kabushiki Kaisha, both of Tokyo, Japan

Filed May 18, 1988, Ser. No. 195,646

Claims priority, application Japan, May 22, 1987, 62-077046[U]

Int. Cl.[4] H02K *21/26*

U.S. Cl. 310—154 **2 Claims**



1. A motor having a rotary shaft, a coil wound on an iron core fixed to said rotary shaft, a yoke member, a magnetic flux producing member for magnetizing said yoke member, and commutator means for supplying electric power to said coil,

said yoke member comprising yoke supporting portions serving as a magnetic path of magnetic flux, and four magnetic poles having substantially arcuate shapes and extending from said yoke supporting portions, each magnetic pole having a largest dimension of thickness at a center portion of the magnetic pole, and extending from the center portion toward ends thereof with a gradually reduced dimension of thickness in accordance with a distance from the central portion, the ends of each magnetic pole respectively opposing corresponding ends of adjacent magnetic poles with a slight distance therebetween, said magnetic poles surrounding an outer periphery of said iron core;

said magnetic flux producing member comprising two rectangular parallelepiped blocks, each of said blocks having a north pole and a south pole at the opposite ends thereof, each of said supporting portions being connected and fixed to a respective magnetic pole of each of said blocks;

said motor forming a shape approximate to a rectangle or a square by said two blocks and said four poles and supporting portions,

wherein a dimension of thickness of the whole motor is set to a value near a dimension of an outer diameter of said iron core.

4,883,997

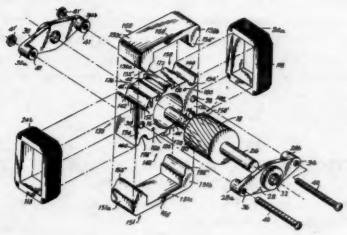
TWO POLE ELECTRIC MOTOR CONSTRUCTIONS WITH STATOR WINDING ENCIRCLING THE ROTOR AND METHOD OF ASSEMBLING SAME

Dominic De Cesare, 223 Center St., Elizabeth, N.J. 07202

Continuation-in-part of Ser. No. 890,134, Jul. 28, 1986. This application Mar. 25, 1988, Ser. No. 173,444

Int. Cl.[4] H02K *1/00*

U.S. Cl. 310—179 **8 Claims**



1. A construction for a two-pole motor, comprising a main stator section provided with a central cylindrical opening; a rotor within said cylindrical opening mounted for rotation about a motor axis, said main stator section defining lateral stator portions on opposite sides of said cylindrical opening and generally flat top and bottom stator surfaces above and below said cylindrical opening, each of said top and bottom stator surfaces including a coil bearing surface generally coextensive with said cylindrical opening and yoke-abutting surfaces, on each side of said coil bearing surfaces, and generally coextensive with said lateral stator portions; stator windings defining an opening configured and dimensioned to extend over said lateral stator portions with clearance and moved into abutment against said coil bearing surfaces, said stator windings encircling said rotor; stop means on said coil bearing surfaces for limiting movement of said stator coils from one side of the motor axis to the other side thereof while aligning said stator coils axially with the rotor in overlapping relationship therewith; and generally U-shaped upper and lower yokes each having a pair of lateral yoke arms and a transverse yoke portion, said U-shaped yokes being dimensioned to maintain said stator coils on said coil bearing surfaces in overlapping relationship with said rotor.

4,883,998

BRUSH GEAR FOR AN ELECTRIC MOTOR

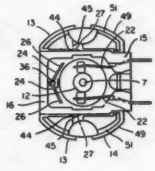
James C. Lau, North Point, Hong Kong, assignor to Johnson Electric Industrial Manufactory, Limited, Chaiwan, Hong Kong

Filed May 4, 1987, Ser. No. 45,561

Claims priority, application United Kingdom, May 2, 1986, 8610774

Int. Cl.[4] H02K *13/00*

U.S. Cl. 310—239 **13 Claims**



1. An electric motor comprising a housing, a rotor mounted

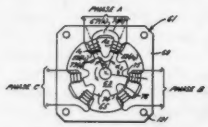
in the housing for rotation about an axis, the rotor having a commutator, a brush assembly having a brush and a brush arm supporting said brush and resiliently biassing the brush against the commutator, and a frame supporting the brush arm, wherein holding means is provided on the frame for holding the brush away from the commutator as the frame is inserted into the motor transversely of said axis, release means being provided to release the brush to bear against the commutator as the frame is inserted in the housing said holding means includes a resilient arm having an end which engages one of said brush arm and said brush to hold the brush away from the commutator, and said release means comprises a stop provided on the housing to contact the arm to urge the arm out of engagement with the said one of said brush arm and brush to release the brush onto the commutator as the frame is inserted in the housing.

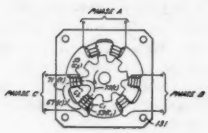
4,883,999

POLYPHASE ELECTRONICALLY COMMUTATED RELUCTANCE MOTOR

James R. Hendershot, Rockford, Ill., assignor to Pacific Scientific Company, Rockford, Ill.

Filed Aug. 15, 1988, Ser. No. 232,436
Int. Cl.[4] H02K *1/14*
U.S. Cl. 310—254 **34 Claims**





1. An electric machine powered by a polyphase source comprising:

a first member of magnetic permeable material, having plurality of poles unevenly spaced relative to one another;

a second member of magnetically permeable material, having a plurality of poles evenly spaced relative to one another;

means for mounting said first and second members for relative movement such that said poles of said first and second members face one another;

said poles of said first member being arranged in pairs such that the intra-pair spacing between poles of a pair is approximately equal to the even spacing of said poles of said second member and the inter-pair spacing between poles of different pairs is unequal to the even spacing of said poles of said second member such that at least one but not all of said pairs may be simultaneously aligned with said poles of said second member to form a low reluctance path between said first and second members; and

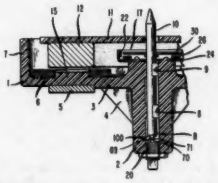
means for forming a magnetic flux path bridging said first and second members which polarizes said at least one pair of poles of said first member to form salient magnetic poles of opposite polarity such that the portion of said flux path through said first member does not overlap any other flux paths found in said first member.

4,884,000

BRUSHLESS DC MOTOR INNER TACHOMETER

Siegfried Müller, St. Georgen, Fed. Rep. of Germany, assignor to Papst Motoren KG, St. Georgen, Fed. Rep. of Germany

Continuation of Ser. No. 816,299, Jan. 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 111,991, Jan. 1, 1980, Pat. No. 4,357,550. This application Apr. 8, 1988, Ser. No. 179,577
Claims priority, application Switzerland, Jan. 16, 1979, 401/79
Int. Cl.[4] H02K *11/00*
U.S. Cl. 310—268 **23 Claims**



1. Brushless D.C. motor with axial air gap comprising

a rotating permanent magnet ring of the motor defining an inner cylindrical space;

a tachogenerator for controlling the speed of the motor disposed about the inner cylinder formed by the rotating permanent magnet ring of the motor and wherein the tachogenerator is disposed within the inner cylindrical space defined by the rotating permanent magnet ring of the motor;

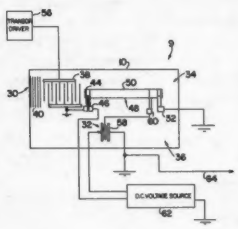
wherein the tachogenerator is disposed about the middle of the axial length of the inner cylindrical space formed by the rotating permanent magnet ring of the motor.

4,884,001

MONOLITHIC ELECTRO-ACOUSTIC DEVICE HAVING AN ACOUSTIC CHARGE TRANSPORT DEVICE INTEGRATED WITH A TRANSISTOR

Robert N. Sacks, and William J. Tanski, both of Glastonbury, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 13, 1988, Ser. No. 283,625
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—313 A **12 Claims**



1. A hybrid integrated device having an acoustic charge transport device monolithically integrated with a transistor, comprising:

a substrate structure having first and second portions formed in a piezoelectric semiconducting substrate;

an acoustic charge transport device formed in said first structure portion including

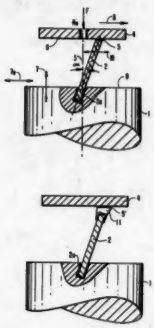
a transducer means for launching along a propagation axis surface acoustic waves characterized by maxima and minima of electrical potential which transport electrical charge provided thereto;
a reflector means formed in said first portion at an end thereof adjacent to said transducer means for reflecting said surface acoustic waves;
a first electrode means for providing electrical charges to said surface acoustic waves,
a transport channel formed in said substrate to have a major dimension extending parallel to said propagation axis, said channel, for receiving said charges and providing lateral and vertical confinement of said charges propagating with said surface acoustic waves;
a second electrode means receiving modulation signals and electrically configured with said transport channel to alter the electrical potential barrier height therein in accordance with said modulation signals, thereby controlling the amount of charge propagating with said surface acoustic waves,
a third electrode means configured with said transport channel for sensing said modulated propagating charge and generating an electrical signal indicative thereof;
a fourth electrode means configured with said transport channel at an end thereof distal to said first electrode means for electrically removing said propagating charge; and
a transistor means formed in said second structure portion including
a source means for providing electrical carriers;
a gate means receiving control signals for controlling the amount of carriers provided from said source means;
a drain means for receiving said carriers.

4,884,002

ROTARY OR LINEAR ELECTRIC MOTOR WHOSE ARMATURE IS DRIVEN BY MEANS OF ULTRASONIC VIBRATIONS

Roland K. Eusemann, Aachen; Heinrich A. Oepen, Stolberg-Gressenich, and Anton Hammers, Aachen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 19, 1988, Ser. No. 260,204
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1987, 3735623
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—323 **15 Claims**



1. A rotary or linear electric motor whose armature (4) is driven by piezo-electric vibration elements (1) which are made to resonante by means of high-frequency electrical oscillations in order to produce ultrasonic vibrations which are transmitted to a plurality of drive pins (2) which are arranged as brushes and against whose free ends (5) a friction surface (6) of the armature (4) is pressed, the individual drive pins (2) being disposed at an angle α relative to the normal to the contact portion of the friction surface (6), characterized in that the setting angle α is selected to be equal to or slightly larger than the static-friction angle, which is defined as follows

$$\alpha \text{ static friction} = \arctan \mu,$$

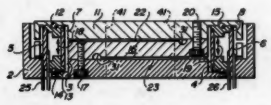
where μ is the coefficient of friction between the drive pins (2) and the friction surface (6).

4,884,003

COMPACT MICROMOTION TRANSLATOR

John B. Hayes, Tucson, Ariz., assignor to Wyko Corporation, Tucson, Ariz.

Filed Dec. 28, 1988, Ser. No. 291,178
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 **15 Claims**



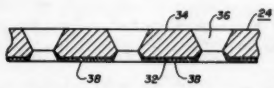
1. Apparatus for tilt-free translation of a first plate relative to a second plate, comprising in combination:
(a) flexure plate means located between the first and second plates for urging the first and second plates together;
(b) first, second, and third spaced piezoelectric transducers each expandable and contractible along a corresponding axis;
(c) means for translating expansion and contraction of each of the first, second, and third piezoelectric transducers to produce translation of the first plate relative to the second plate;
(d) means for applying first, second, and third voltages to the first, second, and third piezoelectric tranducers, respectively, to cause them to expand or contract equally.

4,884,004

COLOR CATHODE-RAY TUBE HAVING A HEAT DISSIPATIVE, ELECTRON REFLECTIVE COATING ON A COLOR SELECTION ELECTRODE

Samuel B. Deal, Lancaster, and Donald W. Bartch, Wrightsville, both of Pa., assignors to RCA Licensing Corp., Princeton, N.J.

Filed Aug. 31, 1988, Ser. No. 238,378
Int. Cl.[4] H01J *29/07, 9/02*
U.S. Cl. 313—402 **5 Claims**



1. In a color cathode-ray tube comprising an evacuated envelope having therein means for producing at least one electron beam, a phosphor screen and a color selection electrode disposed adjacent to said screen, said color selection electrode having a heat dissipative and electron reflective coating on a surface thereof facing said electron beam producing means, the improvement wherein said coating comprises
a compound selected from the group consisting of bismuth oxide-potassium silicate and tungsten-potassium silicate.

3. In a method of making a heat dissipative and electron reflective coating for a color selection electrode of a color cathode ray tube having an evacuated envelope with electron beam producing means therein and a phosphor screen on a portion of said envelope adjacent to said color selection elec-

trode, said coating being on a surface of said color selection electrode facing said electron beam producing means, the method comprising the steps of

(a) forming an aqueous suspension of a compound selected from the group consisting of bismuth oxide-potassium silicate and tungsten-potassium silicate, and

(b) spraying a plurality of layers of said compound onto said surface of said color selection electrodes to form said coating.

4,884,005

COLOR PICTURE TUBE WITH SUPPORT MEANS FOR SUSPENDING THE MASK

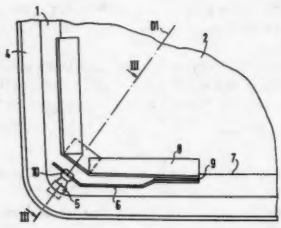
Walter Kornaker, Ulm, and Horst Ruopp, Deizisau, both of Fed. Rep. of Germany, assignors to Nokia Graetz, Pforzheim, Fed. Rep. of Germany

Continuation of Ser. No. 17,557, Feb. 24, 1987, abandoned. This application Jun. 15, 1988, Ser. No. 208,870

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1986, 3606469

Int. Cl.[4] H01J *29/07*

U.S. Cl. 313—404 **5 Claims**



1. A color picture tube, comprising:

a funnel portion;

a neck portion attached to said funnel portion;

a generally rectangular faceplate having sidewalls attached to said funnel portion;

studs having a base portion attached to the inside of the sidewalls of the faceplate at the corners of said rectangular faceplate, said studs extending inwardly and having spherical ends;

a shadow mask disposed within the faceplate, said shadow mask being generally rectangular and having a rim extending about its periphery;

auxiliary brackets mounted to the corners of the rim of the shadow mask; and

resilient strip-like retaining springs having first ends attached to said auxiliary brackets and mid portions extending essentially parallel to the rim of the shadow mask to second ends in proximity to said studs, said second ends being bent so as to be perpendicular to longitudinal axes of the studs, said second ends including apertures for receiving a portion of the spherical ends of the studs, whereby the second ends of the strip-like retaining springs are resiliently retained on said studs by the resiliency of the retaining springs so that said shadow mask is retained within said faceplate.

4,884,006

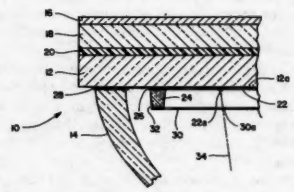
INNER SURFACE SPECULAR REFLECTION SUPPRESSION IN FLAT CRT FACEPLATE

Charles J. Prazak, III, Elmhurst, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 30, 1986, Ser. No. 947,732

Int. Cl.[4] H01J *29/28, 9/20*

U.S. Cl. 313—474 **8 Claims**



1. A low cost CRT faceplate with suppressed reflections from its screen-bearing rear surface, comprising:

a flat glass faceplate having a rear surface roughened by a single lapping operation using loose grains on a hard, rigid grinding wheel in roughening said rear surface to a roughness on the order of 6–9 micro-inches root means square (RMS) depression value range such that it is ineffective to produce specularly reflected images and reflects light incident therein diffusely while being capable of accurately transmitting a video image therethrough; and

a phosphor screen disposed on said roughened rear surface of said flat glass faceplate, whereby light images formed in said screen by electron bombardment and viewed through said screen, being substantially in the plane of said roughened rear surface, are not impaired, but images of objects in the surroundings are reflected diffusely and are not visible through said flat glass faceplate.

4,884,007

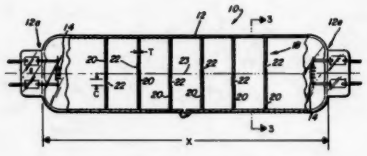
LOW PRESSURE ARC DISCHARGE TUBE HAVING INCREASED VOLTAGE

Radomir Lagushenko, and Jakob Maya, both of Brookline, Mass., assignors to GTE Products Corporation, Danvers, Mass.

Continuation of Ser. No. 678,958, Dec. 6, 1984, abandoned. This application Dec. 15, 1988, Ser. No. 285,370

Int. Cl.[4] H01J *61/30*

U.S. Cl. 313—573 **13 Claims**



1. A low pressure arc discharge tube comprising:

an envelope having an elongated substantially cylindrical shape, said envelope having an internal diameter, a longitudinal axis and two axially opposed end portions;

first and second electrodes each located within a respective one of said axially opposed end portions;

an ionizable medium enclosed within said envelope including an inert starting gas and a quantity of mercury for producing a plasma discharge when a predetermined voltage is applied across said electrodes; and

structural means located within said envelope including at

least one partition having a predetermined thickness and extending substantially across said envelope in a direction substantially normal to said longitudinal axis of said envelope and having a single aperture with a given diameter located at the midpoint of said partition, the ratio of said internal diameter of said envelope to said aperture of said partition is within the range of from about 5:1 to 50:1, said structural means providing an increase in the voltage across said low pressure arc discharge tube without increasing the effective arc length of said tube.

4,884,008

AUTO-ADJUSTABLE OPERATING ROOM LIGHT

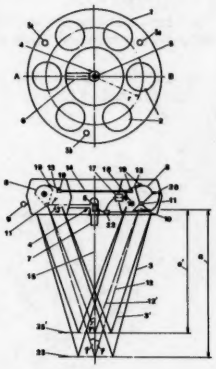
Hans J. Bossler, Münster/Altheim; Peter Enders, Frankfurt; Jörg Boxhammer, Griesheim; Bernd Rudolph, Alzenau, and Bruno Sebralla, Bruchköbel, all of Fed. Rep. of Germany, assignors to W.C. Heraeus GmbH, Hanau, Fed. Rep. of Germany

Filed Mar. 9, 1988, Ser. No. 165,779

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 3723009

Int. Cl.[4] F21V *23/00*

U.S. Cl. 315—152 **14 Claims**



1. Operating room light having

a housing **(1)**;

manually operable means **(4, 6)** on the housing for adjusting the position of the housing with respect to a reference;

light generating and directing means **(2)** generating light and directing the light, separately, from at least two spatially separate regions of the housing in form of at least two light beams on a surface **(25)** to be illuminated;

adjustment means **(14, 16–19, 36)** coupled to the light generating and directing means to direct the light to said surface such that the at least two beams provide a predetermined illuminated field on said surface,

and comprising, in accordance with the invention,

an ultrasonic distance sensor **(5)** located on the housing facing said surface **(25)** and generating an electrical distance signal (w) representative of the actual distance between said housing and said surface;

manual operation sensing means **(7)** coupled to said manually operable means **(4, 9)** on the housing, and generating a manual handling signal;

and a positioning system **(34, 34')** including a servo control circuit **(22, 34, 34')** coupled to receive said distance signal (w) and said manual adjustment signal, and controlling said adjustable means **(14, 16–19, 36)** for controlling said light generating and directing means in accordance with said actual distance signal when said manual adjustment signal is present.

4,884,009

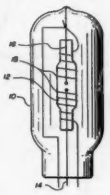
COLOR SELECTABLE SOURCE FOR PULSED ARC DISCHARGE LAMPS

Harold L. Rothwell, Jr., Georgetown, Mass., and Jeffrey O. Grant, Indianapolis, Ind., assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 18, 1987, Ser. No. 135,192

Int. Cl.[4] H05B *41/30*; H01J *7/24, 61/12*

U.S. Cl. 315—246 **21 Claims**



1. A method of producing light substantially within a particular color band from an emission light source in a pulsed metal halide arc lamp comprising the steps of:

(a) selecting a desired band of colored light;

(b) adjusting the vapor pressure of the metal halide salt in the lamp to within the range of from about 0.3 to 10 Torr; and

(c) applying a high voltage current pulse of from about 0.5 to 2.0 Kv to said lamp, for a sufficient period of time to generate the desired color.

4,884,010

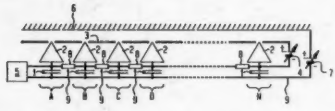
ELECTRON-EMITTING DEVICE AND ITS APPLICATION PARTICULARLY TO MAKING FLAT TELEVISION SCREENS

Jean P. Biberian, 16 Impasse Mouillas, 13008 Marseille, France

Filed Aug. 10, 1988, Ser. No. 230,775

Int. Cl.[4] H01J *29/70, 1/02*; G09G *3/02*

U.S. Cl. 315—366 **3 Claims**

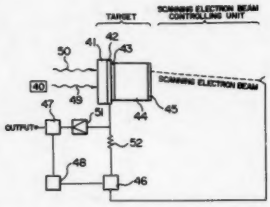


1. A flat television screen, comprising several electron-emitting devices, each essentially consisting of an electric power supply connected to two plates of a capacitor supplying by one of these plates at least one field emission tip and an extraction grid placed close to the top of the field emission tip, said grid itself being connected to the other plate of the capacitor by a variable voltage generating device, these devices being connected together facing a fluorescent screen placed to receive a flow of electrons emitted by the field emission tips of each of the devices.

4,884,011
LIGHT-DETECTING DEVICE

Tatsuo Makishima, Mitaka; Tadaaki Hirai, Koganei; Kazutaka Tsuji, Hachioji, all of Japan; Sachio Ishioka, Burlingame, Calif.; Takashi Yamashita, Sagamihara; Keiichi Shidara, Tama, both of Japan; Junichi Yamazaki, Kawasaki, and Masaaki Aiba, Tokyo, both of Japan, assignors to Hitachi, Ltd. & Nippon Hoso Kasai, Tokyo, Japan

Filed Jan. 13, 1988, Ser. No. 143,384
Claims priority, application Japan, Jan. 14, 1987, 62-4868
Int. Cl.[4] H04N *3/14*
U.S. Cl. 315—368 **23 Claims**

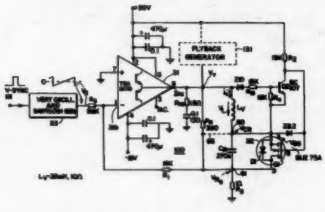


1. A light-detecting device comprising:
a photo-electric conversion unit for converting a light to a charge;
a power supply for applying an electric field to the photo-electric conversion unit;
a light source for applying an incident light to the photo-electric conversion unit;
means for applying also a measurement light from an object to said photo-electric conversion unit;
a signal detection means for detecting a charge corresponding to the incident light from the light source converted by the photo-electric conversion unit; and
a signal hold means for controlling the power supply to adjust the electric field applied to the photo-electric conversion unit in order to hold an output signal of the signal detection means at a predetermined level.

4,884,012
VERTICAL DEFLECTION CURRENT GENERATOR

Giovanni M. Leonardi, Zurich, Switzerland, assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Jun. 15, 1988, Ser. No. 206,780
Int. Cl.[4] H01J *29/70, 29/76*
U.S. Cl. 315—397 **13 Claims**

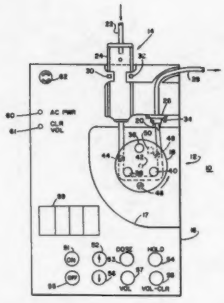


1. A television vertical deflection apparatus, comprising:
a source of an input signal at a frequency that is related to a deflection frequency;
a vertical deflection winding having a pair of terminals;
a vertical deflection circuit output stage responsive to said input signal and coupled to one of said pair of terminals for developing at said one terminal an output voltage that produces a deflection current in said deflection winding, said output voltage including a retrace pulse portion that produces a corresponding retrace portion of said deflection current during a retrace interval and a trace portion that produces a corresponding trace portion of said deflection current during a trace interval;
a retrace capacitance coupled to the other one of said pair of terminals; and
switching means coupled to a junction terminal between said retrace capacitance and said other one of said pair of terminals of said deflection winding for conducting said trace portion of said deflection current in a manner that bypasses said retrace capacitance during said trace interval when said switching means is at a first state, and for enabling said retrace portion of said deflection current to flow in said retrace capacitance when said switching means is at a second state for developing a resonant retrace pulse at the other one terminal of said deflection winding such that said retrace pulse portion of said output voltage and said resonant retrace pulse are oppositely directed pulses during at least a portion of said retrace interval to provide a rapid retrace of said deflection current.

4,884,013
MOTOR UNIT FOR A FLUID PUMP AND METHOD OF OPERATION

Edward Jackson, Northford, and Joseph Pasqualucci, Seymour, both of Conn., assignors to Sherwood Medical Company, St. Louis, Mo.

Filed Jan. 15, 1988, Ser. No. 144,795
Int. Cl.[4] A61M *5/00*
U.S. Cl. 318—481 **8 Claims**



1. A motor unit for a medical fluid delivery system for use with a disposable delivery set for pumping medical fluid, comprising:
pump operating means, including a motor, for acting in cooperation with said delivery set to deliver a volume of said fluid during each operating cycle;
pump control means for controlling said pump operating means to deliver said fluid at a desired volumetric rate, said pump control means including means responsive to signals indicating said desired rate for activating said pump operating means for one of said operating cycles and for repeating said activation at variable time intervals selected in accordance with said desired volumetric rate;
wherein said pump control means includes means for sensing a condition of said pump operating means with respect to said operating cycle; and
wherein said pump operating means comprises a DC motor and wherein said means for sensing the condition of said pump operating means comprises means for sensing the AC component of the current supplied to said DC motor.
6. A motor unit for a medical fluid delivery system for use with a disposable delivery set having a flexible pump tube for

engagement with said motor unit for pumping medical fluids, comprising:

a housing for receiving at least portions of said delivery set;

a motor mounted on said housing;

a rotor mounted on said housing and driven by said motor for rotational movement with respect to said housing and for receiving said flexible pump tube for forming a peristaltic pump;

at least one magnet and at least one magnetic field detector mounted to said rotor and said housing for relative rotational motion with respect to each other, said magnet and said magnetic field detector being operatively adjacent to each other at at least one rotational position of said rotor;

and pump control means, responsive to selection of a fluid delivery rate and responsive to said magnetic field detector, for operating said motor until said rotor is in said rotational position with said magnet and said magnetic field detector adjacent each other and for repeating said operation at variable time intervals selected in accordance with said selected fluid delivery rate.

8. In a fluid delivery system comprising a motor unit and a disposable delivery set, wherein said motor unit includes a motor driven rotor for engaging a flexible pump tube on said delivery set to form a peristaltic pump, a method for detecting the absence of the pump tube on said rotor, comprising:

providing current to a DC motor to operate said rotor;

detecting an AC component of the current provided to said DC motor; and

comparing the detected AC component of said current to a reference level to detect current variation resulting from the presence of the pump tube on said rotor.

4,884,014

POSITION CONTROL METHOD

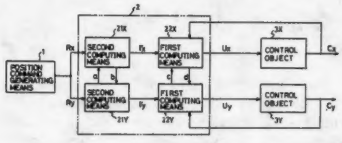
Hiroshi Itoh, Numazu, Japan, assignor to Toshiba Machine Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1988, Ser. No. 174,963

Claims priority, application Japan, Mar. 30, 1987, 62-79216

Int. Cl.[4] G05B *19/29*

U.S. Cl. 318—600 **7 Claims**



1. A position control method for controlling a position simultaneously along a plurality of i axes, comprising the steps of

controlling said position on an i^{th} axis in accordance with a control input signal U_i which is generated in response to a position command signal R_i and a state variable X_i for each axis produced on the basis of a position command signal in such a manner as to optimize an evaluation function J; and

generating said control input signal U_i so as to optimize said evaluation function J in such a manner as to reduce a path error by taking into account both the position command signal R_i and the state variable X_i for said i^{th} axis and also a position command signal R_k and the state variable X_j for another axis j.

4,884,015

PROBING CONTROL METHOD AND APPARATUS FOR MECHANISM WITH MULTIPLE DEGREES OF FREEDOM

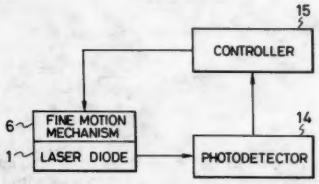
Koichi Sugimoto, Hiratsuka; Hisaaki Hirabayashi, and Tomoyuki Masui, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 17, 1986, Ser. No. 875,189

Claims priority, application Japan, Jun. 17, 1985, 60-129806; Sep. 30, 1985, 60-215014

Int. Cl.[4] G05B *1/06*

U.S. Cl. 318—640 **11 Claims**



1. A probing method for effecting optical access alignment of an optical fiber in a laser diode with optical fiber, said method employing a mechanism with a plurality of degrees of freedom, said method comprising the steps of:

driving by predetermined amounts in one-by-one fashion a plurality of actuators for driving said mechanism;

determining change in an optical output from an object in response to the driving of each of the actuators and obtaining a gradient in the optical output on the basis of the change determined;

obtaining an amount of movement for driving each of said actuators on the basis of the gradient in the optical output in an immediately preceding step of driving the same actuator, driving the same actuator by the amount of movement thus obtained, and sequentially measuring the optical output in response to the driving of each actuator; and

determining whether conditions have occurred of said optical output exceeding a first predetermined value or said gradient in the optical output falling below a second predetermined value, stopping the driving of the actuators when one of said conditions has occurred, and repeating the step of driving the actuators in one-by-one fashion when none of said conditions have occurred.

4,884,016

CLOSED LOOP TORQUE ANGLE CONTROL OF SYNCHRONOUS MOTOR

Michael E. Aiello, Monroeville, Pa., assignor to Aerotech, Inc., Pittsburgh, Pa.

Filed Aug. 23, 1988, Ser. No. 235,983

Int. Cl.[4] G05B *19/40*

U.S. Cl. 318—685 **9 Claims**

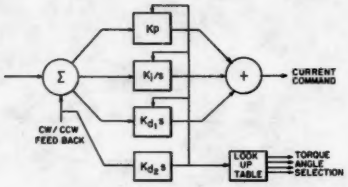
1. In a closed loop motor system having a motor with a plurality of poles and motor windings associated therewith, said poles defining full step motor output positions, said system of the type that assigns intermediated current values to the motor windings for fine step positions of the motor output between motor poles, the improvement comprising

a motor output position encoder for generating an integral and fixed number of encoder pulses as the motor moves between any two motor poles, said pulses being equally spaced and at least some corresponding to the fine step positions,

means for assigning intermediate current values comprising a counter for counting the encoder pulses, function means for converting the count to digital sine and cosine values, digital-to-analog means for converting the digital sine and

cosine values to analog sine and cosine values, means for controlling electrical current to the motor windings associated with the poles in response to the analog sine and cosine values,

means for setting the torque angle comprising means for adding or subtracting a torque angle value from the count applied to the function means, and



initializing means comprising means for applying full step current values to motor windings for a time interval in which the motor output is assumed to align with a full step position, and means for zeroing the count in the counter and assigning the torque angle value, whereby the encoder does not require mechanical alignment relative to the motor.

4,884,017

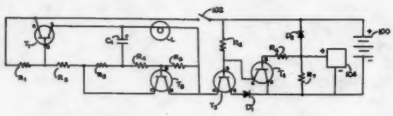
SOLAR POWERED CONSTRUCTION LIGHT

Lloyd E. Williams, West Monroe, La., assignor to Power Plus, Inc., West Monroe, La.

Continuation of Ser. No. 34,709, Apr. 6, 1987, Pat. No. 4,751,622. This application Mar. 7, 1988, Ser. No. 165,185

Int. Cl.[4] F21L *13/00;* **H02J** *7/00*

U.S. Cl. 320—2 **3 Claims**



1. A switching circuit for selectively supplying electrical energy to a means for emitting light, comprising:

a. a rechargeable storage battery means for supplying electrical energy to said means for emitting light, said battery means having a positive pole and a negative pole,

b. a first transistor, the emitter of said first transistor being connected to said positive pole of said rechargeable storage battery means and the collector of said first transistor being connected to said means for emitting light,

c. a second transistor, the collector of said second transistor being connected to said means for emitting light,

d. a first diode, the emitter of said first diode being connected to said negative pole of said rechargeable storage battery means and the base of said first diode being connected to the emitter of said second transistor,

e. a first resistor connected to said first transistor between the emitter and the base of said first transistor,

f. a second resistor connected between said positive pole of said rechargeable storage battery means and the base of said second transistor, said first resistor and said second resistor having sufficient resistance when said rechargeable storage battery means is initially connected to said circuit to bias said first transistor to conduct electrical energy from the emitter of said first transistor to the collector of said first transistor and to bias said second transistor to conduct electrical energy,

g. a third transistor having a third resistor connected between the base of said third transistor and the collector of said second transistor, the emitter of said third transistor being connected to the collector of said second transistor,

h. a capacitor, said capacitor having a fourth resistor connected between the negative side of said capacitor and the base of said third transistor, the positive side of said capacitor being connected to the collector of said first transistor, a fifth resistor being connected between the negative side of said capacitor and the collector of said third transistor, a sixth resistor being connected between the base of said first transistor and the collector of said third transistor,

i. a fourth transistor, the collector of said fourth transistor being connected to the base of said second transistor, and the emitter of said fourth transistor being connected to said negative pole of said rechargeable storage battery means,

j. a solar cell means, the positive pole of said solar cell means being connected to the base of said fourth transistor, and

k. a second diode, the base of said second diode being connected to said positive pole of said solar cell means and to the emitter of said fourth transistor, and the emitter of said second diode being connected to the positive pole of said rechargeable storage battery means, the negative pole of said solar cell means being connected to the negative pole of said rechargeable storage battery means.

4,884,018

DEVICE FOR SUPPLYING ELECTRICITY AT A TEMPORARY OVERVOLTAGE TO AUXILIARY CIRCUITS OF AN AUTOMOBILE

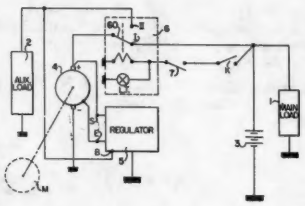
Jean-Pierre Meuret, Noisy-le-Sec; Christian Ducrot, Creteil, and Marcel Vogelsberger, Sceaux, all of France, assignors to Ducellier & Cie, Creteil, France

Filed May 21, 1987, Ser. No. 53,133

Claims priority, application France, May 23, 1986, 86 07403; Oct. 16, 1986, 86 14368

Int. Cl.[4] B60L *1/02;* **H02J** *7/14*

U.S. Cl. 322—8 **12 Claims**



1. A device for providing a temporary overvoltage to an auxiliary electrical circuit load in an automobile, the automobile having an engine and a main electrical circuit including a main electrical circuit load, a battery for supplying electrical current to the main electrical circuit at nominal voltage magnitude, an alternator coupled to the engine and having a rectified stator output voltage for charging the battery, said device comprising:

voltage regulation means including an excitation voltage output coupled to the alternator for providing control excitation current to the alternator to control the magnitude of the alternator output voltage, said voltage regulation means including a control voltage input;

commutation means coupled to the alternator rectified stator output and having two operative conditions for connecting the alternator stator output to the battery when in its first operative condition and to the auxiliary electrical circuit when in its second operative condition, said commutation means further connecting the alternator stator output to said control voltage input of said voltage regula-

tion means when in its second operative condition to cause said voltage regulation means to produce said control excitation current to increase the magnitude of the rectified stator output voltage whereby said auxiliary electric circuit load is powered at an overvoltage and reduced current generated by the alternator, and

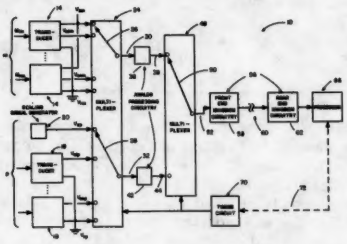
control means coupled to said commutation means for operating said commutation to one or the other of its first and second operative conditions.

4,884,019

ACCURATE ANALOG MEASUREMENT SYSTEM

Charles B. McKee, Jr., Fort Collins, Colo., assignor to In-Situ, Inc., Laramie, Wyo.

Filed Jan. 29, 1988, Ser. No. 150,050
Int. Cl.[4] G01R *23/16*
U.S. Cl. 324—77 R **23 Claims**



1. An accurate analog measurement apparatus, comprising:

first means for outputting a measurement signal, said measurement signal representing a parameter measured from a physical quantity, wherein said measurement signal is subjected to a level of signal distortion while being transmitted using the apparatus;

at least a first signal for use in reducing the signal distortion of said measurement signal, wherein said first signal is subjected to a level of signal distortion while being transmitted using the apparatus;

second means responsive to said measurement signal and said first signal for receiving, in accordance with one of the following: simultaneously and sequentially, said measurement signal and said first signal, said second means including a common path along which said first signal and said measurement signal are transmitted wherein substantially the same level of signal distortion is experienced by said first signal and said measurement signal while being transmitted along said common path; and

third means for receiving both of said measurement signal and said first signal from said second means via said common path, said third means including means for processing said measurement signal and said first signal to provide an output signal, whereby said output signal is representative of the measured parameter and has reduced signal distortion effects.

4,884,020

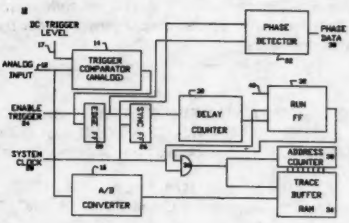
PHASE DETECTION SYSTEM

Thomas R. Blakeslee, Woodside, Calif., assignor to Orion Instruments, Inc., Redwood City, Calif.

Filed Jul. 22, 1988, Ser. No. 222,943
Int. Cl.[4] G01R *25/00*
U.S. Cl. 324—83 D **2 Claims**

1. A method of determining relative phase angle between a known reference and a signal under test including the steps of

providing a reference signal to a multi-tap delay line, the number of taps being at least equal to the number of phases into which the signal under test is to be resolved, and



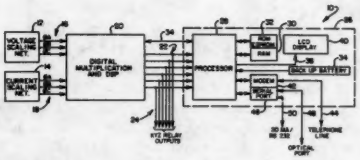
clocking a parallel shift register by the signal under test to capture the value of each of the delay line taps.

4,884,021

DIGITAL POWER METERING

Scott H. Hammond, Columbus; Ronald L. Kirk, Findlay, and Eric R. Francis, Columbus, all of Ohio, assignors to Trans-Data, Inc., Tyler, Tex.

Continuation of Ser. No. 42,306, Apr. 27, 1987, abandoned. This application Oct. 14, 1988, Ser. No. 258,089
Int. Cl.[4] G01R *21/06;* G01F *15/20*
U.S. Cl. 324—142 **43 Claims**



1. Apparatus for metering an electrical power supply, comprising:

step-down means connectable with said supply for deriving first and second electrical parameter sample signals of given waveform amplitudes during corresponding given cycles of said supply;

amplifier means having gain characteristics controllable in response to a gain control input for selectively amplifying said first and second sample signals to provide corresponding first and second scaled signals;

converter means actuable for converting said first and second sample signals to corresponding first and second range digital values and subsequently actuable to convert said first and second scaled signal to corresponding first and second data digital values; and

control means for actuating said converter means to derive said first and second range digital values and deriving corresponding first and second scaling factors, responsive to said first and second range digital values for providing said gain control input at predetermined scaling levels, for subsequently actuating said converter means to derive said first and second data digital values, said control means multiplying said first and second data digital values with respective said first and second scaling factors to provide first and second expanded data digital values within a range extending to at least about twenty-one binary bits, said control means being responsive to a predetermined commencement location of the said waveform of a said first electrical parameter sample signal for commencing said actuation of said converter means and subsequently effecting said actuation at predetermined, regular intervals, said control means including a parameter memory for selectively retaining said first expanded data digital

values and responsive to effect a multiplication of each said parameter memory retained first expanded data digital value with a said second expanded data digital value from the sequence thereof developed following a delay selected to derive predetermined power parameter metering output data.

4,884,022

VOLTAGE TESTING DEVICE ATTACHABLE TO THE BLADE TERMINALS OF A POWER METER

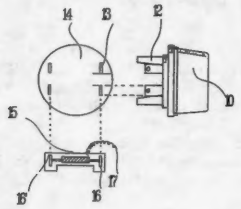
Roy G. Bishop, 31 Donlea Drive, Port Colborne, Ontario, Canada (L3K 4W8)

Filed May 25, 1988, Ser. No. 198,212

Claims priority, application Canada, May 28, 1987, 538269

Int. Cl.[4] G01R *1/04, 19/00;* G08C *19/00*

U.S. Cl. 324—157 **9 Claims**



1. A voltage monitoring device for use with a standard plug-in type electricity meter having a meter housing with protruding blades fitting into corresponding slots in a meter base, said monitoring device comprising:

a bridge member provided with a pair of spaced slots such that said bridge member can be fitted over a pair of said protruding blades and extend therebetween, said slots being provided with metal contacts to establish contact with said blades, and

electronic circuitry carried by said bridge member, said electronic circuitry being connected to said metal contacts and included means for repeatedly monitoring the voltage of the mains supply, means for storing selected data derived from said measurements for consecutive predetermined periods and means for releasing the stored data upon request.

4,884,023

METHOD AND APPARATUS FOR DETERMINING THE ROTOR RESISTANCE OF A ROTATING-FIELD MACHINE

Rolf Schmidt, and Hubert Schierling, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 9, 1989, Ser. No. 294,830

Claims priority, application Fed. Rep. of Germany, Jan. 14, 1988, 3800915

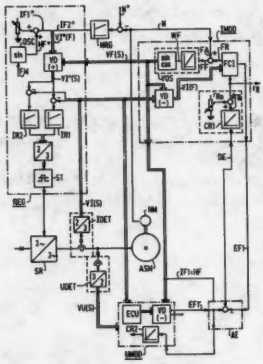
Int. Cl.[4] G01R *31/02, 27/02*

U.S. Cl. 324—158 MG **14 Claims**

1. A method for determining the rotor resistance of a rotating-field machine, at standstill or at low load by means of a voltage model (UMOD) utilizing current values (VI(S)) and voltage values (VU(S)) and a current model (IMOD) for the machine fed with a signal derived form the rotor position (N) and a model parameter (r_R) for the rotor resistance of a machine, using model flux axis (VF(S)) determined by means of the two models, comprising the steps of:

(a) impressing on the machine, a stator current corresponding to a reference current vector (VI*(S)), said current having a component parallel to the model flux axis (FV(S)), having a sinusoidal high-frequency portion (HF*) with a frequency above the nominal frequency of the machine;

(b) calculating a model component (EF1) of the EMF vector of the machine parallel to the model flux axis (VF(S)) by means of the current model; and



(c) calculating a model-component reference value (EF1') by means of said voltage model (UMOD) and generating a high frequency correlated deviation (DE) between said model component (EF1) and said model-component reference value (EF1'), and

(d) correcting said model parameter (r_R) for the rotor resistance until said deviation is minimized.

4,884,024

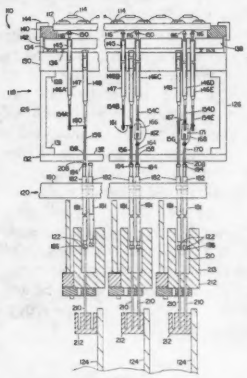
TEST PIN ASSEMBLY FOR CIRCUIT BOARD TESTER

Paul M. DiPerna, North Andover, Mass., assignor to Teradyne, Inc., Boston, Mass.

Continuation-in-part of Ser. No. 799,460, Nov. 19, 1985, abandoned. This application Apr. 16, 1987, Ser. No. 38,909

Int. Cl.[4] G01R *31/02, 15/12*

U.S. Cl. 324—158 F **8 Claims**



1. Apparatus for testing the electrical integrity of a plurality of printed circuit boards under test (BUT), each said BUT having a plurality of downwardly directed accessible BUT nodes at a first pattern of predetermined locations in a first field on its bottom surface, said apparatus comprising:

support means for removably supporting a said BUT,

test circuitry including a plurality of channel circuitry printed circuit boards having upwardly directed channel nodes, said upwardly directed channel nodes being di-

rectly below said support means at a second pattern of predetermined locations in a second field overlapping said first field, said second pattern not matching said first pattern of predetermined locations,

connection means for electrically connecting said channel nodes to said BUT nodes,

said connection means including spring-biased BUT probe contacts in a pattern that matches said first pattern so as to be aligned with and to contact said BUT nodes when said BUT is mounted on said support means,

said connection means also including a translator board carrying a plurality of upper conducting members comprising tubular housings extending from an upper surface of said translator board,

said tubular housings having first wire wrap posts connected to them,

said upper conducting members being electrically connected to and carrying said BUT probe contacts,

said translator board also carrying a plurality of lower conducting members extending downwardly from the lower surface of said translator board,

said lower conducting members including second wire wrap posts,

said lower conducting members being mounted in a pattern that matches that of said channel nodes,

said first and second wire wrap posts having portions overlapping each other along corresponding positions of vertical axes,

said connection means also including translator means electrically connecting respective said tubular housings to respective said lower conducting members,

said translator means including wires connecting respective first and second wire wrap posts,

said connection means also including an interface assembly between said second wire wrap posts and said channel nodes, said interface assembly comprising:

upwardly directed spring biased interface contacts making electrical connection between said second wire wrap posts and said channel nodes, and

said downwardly directed plungers being carried by lower extensions of said interface contacts, there being elastomeric O-rings between said interface contacts and said tubular housings on said interface board, and

an interface board carrying tubular housings carrying said spring biased interface contacts and downwardly directed plungers extending from the lower surface of the interface board and electrically connected to said channel nodes.

4,884,025

PROCESS FOR THE FAULT MONITORING OF AN ELECTRIC VALVE

Michael Häusler, Weilheim, Fed. Rep. of Germany, assignor to Asea Brown Boveri AG, Baden, Switzerland

Filed May 26, 1987, Ser. No. 54,433

Claims priority, application Switzerland, Jun. 6, 1986, 2301/86

Int. Cl.[4] G08B *21/00*; H02H *7/10*

U.S. Cl. 324—158 SC **18 Claims**

13. In a process for fault monitoring an electric valve containing at least two series-connected thyristors, the process comprising the steps of:

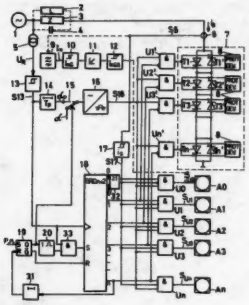
triggering, during a blocked state of the electric valve, the at least two series-connected thyristors associated with a predetermined current direction with the exception of at least one thyristor to be tested of said at least two series-connected thyristors within a predetermined time interval;

conducting a preliminary test prior to triggering said at least two series-connected thyristors, each said thyristor being associated with a triggering channel;

during said preliminary test, checking whether all thyristor triggering channels are in order;

during said checking of said thyristor triggering channels in said blocked state of said electric valve, triggering said at least two series-connected thyristors associated with said predetermined current direction and generating a triggering channel fault signal in the absence of current flow through said electric valve;

in an electric valve in which each one of said at least two series-connected thyristors is connected to a break-over element defining a predetermined break-over voltage, said steps of triggering said at least two series-connected thyristors entails triggering each one of said at least two series-connected thyristors at an applied voltage exceeding said predetermined break-over voltage defined by said break-over element;



said step of generating said triggering channel fault signal entailing the steps of:

applying to a filter an electric valve current which flows through said electric valve after triggering said at least two series-connected thyristors;

filtering, by means of said filter, a harmonic from said electric valve current;

comparing said harmonic with a predetermined limiting harmonic value; and

generating said triggering channel fault signal when said harmonic exceeds said predetermined limiting harmonic value.

4,884,026

ELECTRICAL CHARACTERISTIC MEASURING APPARATUS

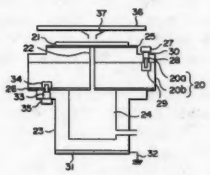
Yuji Hayakawa, and Takuo Uchida, both of Kofu, Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Jun. 20, 1988, Ser. No. 208,666

Claims priority, application Japan, Jun. 24, 1987, 62-157430

Int. Cl.[4] G01R *31/26, 1/06*

U.S. Cl. 324—158 F **6 Claims**



6. An electrical characteristic measuring apparatus, comprising:

a table formed of an insulating material;

a conductor portion arranged on said table, said conductor portion comprising a voltage application electrode and voltage measuring electrode formed in a zig-zag pattern, and an elongated insulating region being formed substan-

tially concentric with each said voltage application electrode and each said voltage measuring electrode;

electrical characteristic detecting means arranged above said conductor portion to oppose an object to be measured placed on said conductor portion; and

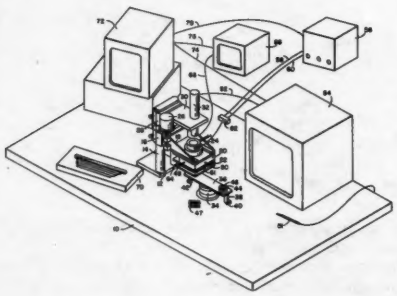
a support table, formed of an insulating member, for supporting said table.

4,884,027

MANUAL MICROCIRCUIT DIE TEST SYSTEM

Daron C. Holderfield, Boaz; Bernard E. Martin, Huntsville, both of Ala., and Samuel S. Russell, Irmo, S.C., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 27, 1988, Ser. No. 263,466
Int. Cl.[4] G01R *31/02, 31/28*
U.S. Cl. 324—158 F **11 Claims**



1. A microcircuit die test system comprising: a die table with means thereon for accurately mounting a test specimen, means for positioning said die table in a position for testing, a test chamber device having means for being positioned relative to said die table to enable electrical test to be made of the test specimen, means for injecting media onto the test specimen to subject the test specimen to selected temperatures, means for positioning the test chamber device relative to said die table, means mounted relative to said test chamber device for adjusting said test chamber device in x and y axes, and means for viewing through said test chamber device to the specimen on said die table.

4,884,028

MAGNETIZING DEVICE WITH YOKE HAVING LOOSELY FITTED COIL SECTIONS FOR MAGNETOGRAPHIC INSPECTION OF QUALITY OF MATERIALS

Valery S. Kozlov, Leninsky prospekt, 16, kv. 76; Elena A. Polyakova, ulitsa Kalinovskogo, 70, kv. 142; Alexei E. Novikov, ulitsa Landera, 69, kv. 9, all of Minsk, and Mikhail T. Krupko, Kolomna, ulitsa Kirova 58, kv. 52, Moskovskaya oblast, all of U.S.S.R.

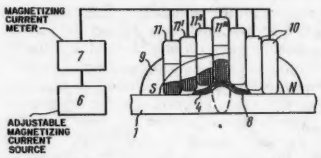
Division of Ser. No. 895,192, Aug. 11, 1986, Pat. No. 4,806,862. This application Mar. 28, 1988, Ser. No. 176,707
Int. Cl.[4] G01N *27/85;* **H01F** *13/00, 17/04*
U.S. Cl. 324—213 **2 Claims**

1. A device for magnetizing a material to be inspected by means of a magnetographic quality inspection method, comprising:

a magnetic yoke having first and second spaced poles for engagement with the material to be inspected and having a central portion between said poles;

a source of magnetizing current;

said magnetizing coil comprising a plurality of coil sections electrically connected to one another in a parallel circuit, each coil section surrounding and loosely fitted on said magnetic yoke for independently shifting in directions perpendicular to the surface of the material inspected whereby said coil sections assume the shape of the surface



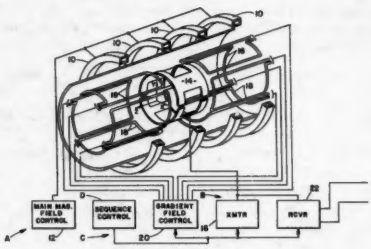
of the material being inspected when placed thereon to provide a substantially uniform magnetization in a test zone of the material upon which said magnetic yoke is placed.

4,884,029

QUICK IMAGING SCHEME UTILIZING DIFFERENTLY PHASE ENCODED PRIMARY AND STIMULATED ECHOES

William Sattin, Cleveland Hts., Ohio, assignor to Picker International, Inc., Highland Hts., Ohio

Continuation-in-part of Ser. No. 897,118, Aug. 15, 1986, Pat. No. 4,774,466. This application Sep. 12, 1988, Ser. No. 243,294
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—309 **13 Claims**



13. A magnetic resonance imaging apparatus comprising:

means for generating a generally uniform main magnetic field through an image region;

a radio frequency means for selectively inducing magnetic resonance of selected dipoles of a subject in the examination region and for selectively causing primary and stimulated echoes;

a phase encoding means for phase encoding the primary and stimulated echoes with different phase angles;

a receiver means for receiving primary and stimulated echo data during the primary and stimulated echoes;

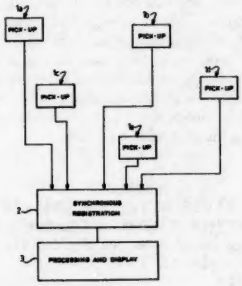
a correcting means for adjusting at least one of the primary and stimulated echo data to correct for discontinuities;

a transform means for transforming the aligned primary and stimulated echo data into an image representation.

4,884,030
METHOD AND SYSTEM FOR ACQUISITION AND SEPARATION OF THE EFFECTS OF ELECTROMAGNETIC FIELDS TO PREDICT EARTHQUAKES

Charles Naville, Grigny; Simon Spitz, Paris, and Rocrol Jean-Pierre, Fresnes, all of France, assignors to Compagnie Generale de Geophysique, France

Filed Apr. 6, 1988, Ser. No. 178,120
Claims priority, application France, Apr. 9, 1987, 8705023
Int. Cl.[4] G01V *3/08, 3/38*
U.S. Cl. 324—344 **13 Claims**

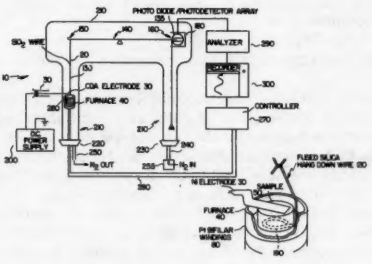


1. A system for acquisition and separation of components of electromagnetic fields generated by simultaneous sources of electromagnetic field in the earth comprising an array of n pick-ups about at the surface of the earth for picking up the components of the electromagnetic fields, connected to registration means, wherein the minimum number n of pick-ups in the array is equal to $2s+2$, s being the number of simultaneous sources to be analyzed, and wherein each pick-up picks up the components of each source.

4,884,031
METHOD AND APPARATUS FOR CHARGE DISTRIBUTION ANALYSIS

Friedemann Freund, 225 Sussex St., San Francisco, Calif. 94131, and Francois Batllo, 1970 Latham St., #25, Mountain View, Calif. 94040

Filed Sep. 29, 1988, Ser. No. 250,951
Int. Cl.[4] G01R *5/28*
U.S. Cl. 324—459 **30 Claims**



1. An apparatus for measurement of electrostatic forces, comprising:

a mass balance including an arm, means attached to said arm for supporting a mass, and means coupled to said arm for determining an amount of force required to maintain said arm at a predetermiend position upon placement of said mass upon said supporting means;

means for heating said mass to a predetermined temperature;

a first electrode and a second electrode positioned near said mass for forming a capacitor with said mass as a dielectric;

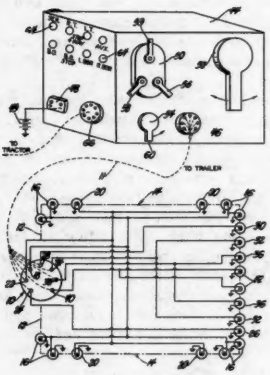
means for applying a potential across said first and second electrodes;

means for displaying any attraction and repulsion between either of said first and second electrodes and said mass upon application of said potential.

4,884,032
TRAILER/TRACTOR LIGHT SYSTEM TESTER

Kenneth R. LaPensee, Mt. Clemens, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 16, 1982, Ser. No. 418,920
Int. Cl.[4] G01R *31/02*
U.S. Cl. 324—504 **1 Claim**



1. Electrical test means for both a military trailer lighting system and an electrical power supply in a military tractor for the lighting system, the test means being configured to provide nonverbal indicia for instructing the human user in operating the test means, the test means comprising;

a three dimensional cabinet having a first upstanding side face and a second upstanding side face; a source of electrical power at the cabinet having a rating similar to the battery power source in the military tractor to be tested;

a first conventional multi-terminal receptacle (**46**) mounted on the first face of the cabinet; a second conventional multi-terminal receptacle (**66**) mounted on the second face of the cabinet; the first receptacle being similar to a receptacle used on the tractor; the second receptacle being similar to a receptacle used on the trailer to be tested;

A manual turn signal controller (**52**) mounted on the first face of the cabinet, the controller being similar to the controller used on the military tractor; a manual multi-function light switch (**50**) mounted on the first face of the cabinet, the multi-function light switch including a lock-out handle (**56**) swingable between locked and unlocked positions, an auxilliary switch handle (**58**) selectively swingable from an off position to various energized positions to control the parking and instrument panel illumination, and a main handle switch (**59**) swingable from a circuit-breaking position to one of several circuit-completing positions to control vehicle service lamps and blackout lights, the multi-function light switch being similar to a switch used on the military tractor;

a spring biased, manually actuable brake switch simulator means (**54**) mounted on the first face of the cabinet having

a manual lever (60) moveable against the spring bias to deliver electrical power to the appropriate brake pin terminal in the first receptacle (46), whereby the brake switch simulator duplicates the action of a brake actuated switch in a military tractor;

the brake switch simulator means having a different shape than the multi-function light switch and being smaller than the manual turn signal controller, the brake switch simulator means being closer to the multi-function light switch than is the manual turn signal controller, the brake switch simulator means being disposed on a corner of the first face of the cabinet diagonally opposite from the manual turn signal controller, whereby the turn signal controller, the multi-function light switch, and the brake switch simulator are tactiley and visually discernable from one another;

a plurality of trailer condition indicator lamps (64) on the second face of the cabinet;

first electrical connections within the cabinet connecting the first receptacle to the power source, turn signal controller, multi-function light switch, and brake switch-simulator means in generally the same manner as the corresponding components in the tractor, whereby the cabinet simulates a conventional tractor power supply for the trailer lighting system;

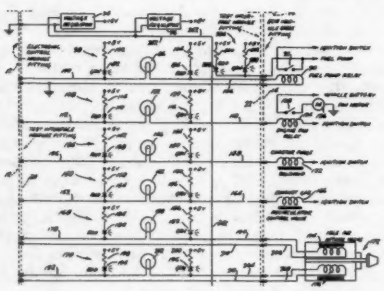
second electrical connections within the cabinet connecting the second receptacle to the indicator lamps in generally the same manner as the corresponding lamps on the trailer, whereby the cabinet simulates the trailer light system; the test means being adapted for testing the trailer lighting system by training a cable between the first receptacle and a receptacle on the front end of the trailer; the test means being adapted for testing the tractor power supply by training the cable between the second receptacle and a receptacle on the rear end of the tractor to be tested; the first and second receptacles being located near the cabinet lower extremities to minimize potential interference between the cable and any one of the turn signal controller, multi-function light switch, brake switch-simulator means or indicator lamps.

4,884,033

DIAGNOSTIC TEST APPARATUS FOR ELECTRICAL SYSTEM OF AUTOMOTIVE VEHICLE

Noel P. McConchie Sr., 6875 Hitchcock Rd., Milford, Mich. 48042

Continuation of Ser. No. 918,269, Oct. 14, 1986, Pat. No. 4,764,727. This application Jun. 6, 1988, Ser. No. 202,258
The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.
Int. Cl.[4] G01R *31/02*
U.S. Cl. 324—503 **18 Claims**



1. A diagnostic test circuit for monitoring the magnitude of electrical parameters existing between an electrical driver and an electrical load comprising, in combination:

(a) visual indicator means connected to a point adjacent the electrical driver, said indicator means providing a visual signal when the voltage at the point of connection lies within a predetermined range, with respect to electrical ground,

(b) additional visual indicator means, separate from the first, connected to a point adjacent the electrical load, said additional indicator means providing a visual signal when the voltage at its point of connection lies within a predetermined range, with respect to electrical ground, and

(c) a third visual indicator means, connected between said electrical driver and said electrical load, said third indicator means providing a visual signal in response to current flowing between said driver and said load,

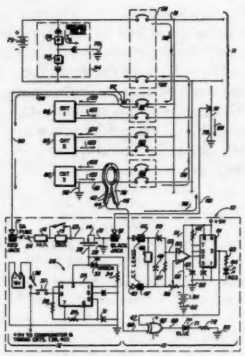
(d) said third visual indicator means having a positive temperature coefficient of impedance whereby it presents a relatively low electrical impedance when experiencing relatively low current flow, and a higher impedance upon experiencing increased current flow.

4,884,034

GROUND FAULT DETECTOR AND LOCATOR

Hermilo Guzman, 8115 W. Krall St., Glendale, Ariz. 85303

Filed Jan. 3, 1989, Ser. No. 292,912
Int. Cl.[4] G01R *31/08*
U.S. Cl. 324—529 **9 Claims**



1. An apparatus for the detection of ground faults in a normally ungrounded a-c or d-c multifeeder power distribution system comprising:

a d-c power supply,

a pulse grounding circuit connected across said power supply,

said pulse grounding circuit comprising transistor means connected across a pair of probe receptacle jacks and a multivibrator means for pulsing said transistor means,

said jacks being connectable across the distribution system for adding a ground fault to the distribution system being checked for ground faults in a pulsating fashion,

whereby the added ground fault in a grounded conduit of the distribution system will create an a-c component of the ground current created thereby for sensing by a sensing circuit,

a sensing circuit comprising a clamp-on current probe,

said probe comprising a yoke for surrounding said grounded conduit of the distribution system which conduit serves as a single primary turn of a transformer,

said yoke being wound with a number of turns of a wire forming a secondary winding of the transformer the termi-

nals forming the ends of said wire being connected across a comparator circuit, and

a comparator circuit for receiving signals from said probe, said comparator circuit when receiving a negative voltage of a predetermined value generating a positive pulse for energizing a first light emitting diode indicating a ground fault on the conduit surrounded by said yoke.

4,884,035

WIDE RANGE DIGITAL PHASE/FREQUENCY DETECTOR

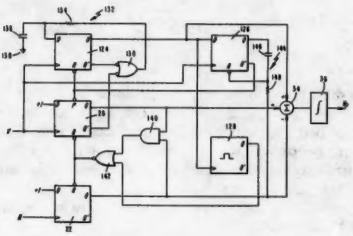
Steven P. Cok, and Robert J. Lewandowski, both of Seattle, Wash., assignors to John Fluke Mfg. Co. Inc., Everett, Wash.

Continuation of Ser. No. 105,468, Aug. 17, 1987, Pat. No. 4,843,332. This application May 15, 1989, Ser. No. 351,229

The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.[4] H03K *9/06*; H03D *13/00*

U.S. Cl. 328—133 **4 Claims**



1. A digital phase/frequency detector for detecting differences in phase or frequency between a variable input signal and a reference input signal comprising:

variable signal and reference signal terminals for receiving the variable and reference input signals;

phase/frequency detector means receiving said variable and reference input signals from said variable and reference signal terminals, the phase/frequency detector means having a preset input and being responsive to a phase or frequency difference between said variable and reference input signals for generating a square wave signal having a duty ratio corresonding to the phase or frequency difference between said variable and reference input signal between a minimum and a maximum phase difference, the duty ratio being repetitively adjusted with each cycle of the variable input signal;

fixed level generator means having a reset input and responsive to said variable input signal and to said square wave signal for generating a fixed level offset signal in response to said variable and reference input signals having a frequency or phase difference greater than or equal to said maximum phase difference;

reset generator means responsive to said variable input signal, said square wave signal, and to said fixed level generator means and for applying a preset signal to said phase/-frequency detector means and a reset signal to said fixed level generator means in response to a phase transition of said variable and reference input signals from a phase value equal to or greater than said maximum phase difference to a phase value less than said maximum phase difference to a phase value less than said maximum phase difference; and

summing means for adding said square wave signal from said phase/frequency detector and said fixed level offset signal from said fixed level generator means and outputting the resultant summed signal.

4,884,036

BAND-PASS FILTER

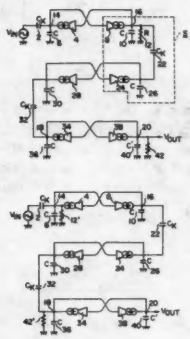
Mikio Koyama, Yokohama, and Hiroshi Tanimoto, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 3, 1988, Ser. No. 163,843

Claims priority, application Japan, Mar. 4, 1987, 62-47850

Int. Cl.[4] H03K *5/00*; H03B *1/00*

U.S. Cl. 328—167 **20 Claims**



1. A band-pass filter comprising:

a first integrating circuit pair including first and second integrating circuits, and first integrating circuit including a first current source connected to first and second nodes and a first integrating capacitor connected to said first node and a predetermined potential, said second integrating circuit including a second current source connected to said first and second nodes and a second integrating capacitor connected to said second node and the predetermined potential;

a second integrating circuit pair including third and fourth integrating circuits, said third integrating circuit including a third current source connected to third and fourth nodes and a third integrating capacitor connected to said third node and the predetermined potential, said fourth integrating circuit including a fourth current source connected to said third and fourth nodes and a fourth integrating capacitor connected to said fourth node and the predetermined potential;

a first coupling capacitor connected to said first node;

a second coupling capacitor connected between said second and third nodes;

a third coupling capacitor connected to said fourth node;

a first termination resistor connected between said first node and the predetermined potential; and

a second termination resistor connected between said third node and the predetermined potential.

4,884,037

FM DEMODULATION CIRCUIT

Akira Sogo, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Jul. 19, 1988, Ser. No. 221,117

Claims priority, application Japan, Jul. 28, 1987, 62-188013; Jul. 28, 1987, 62-188014

Int. Cl.[4] H03D *1/00*

U.S. Cl. 329—336 **5 Claims**

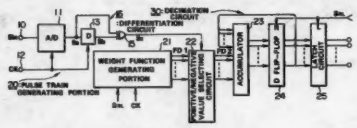
1. A FM demodulation circuit comprising:

(a) analog-to-digital converting portion for converting an inputted frequency-modulated (FM) signal into a digital signal of one bit at a timing based on a predetermined clock signal;

(b) differentiation means for outputting a pulse train in syn-

chronism with said clock signal at every time when a state of said digital signal outputted from said analog-to-digital converting portion varies; and

(c) decimation circuit for weighting each pulse of said pulse train outputted from said differentiation means by a



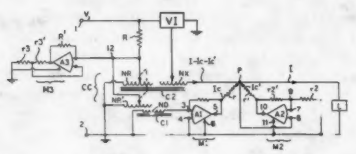
weight function to thereby obtain a weighted function value and then accumulating said weighted function value during a predetermined period, so that said FM signal will be demodulated to thereby obtain a demodulated signal in the form of a linear pulse code modulated (a linear PCM) signal.

4,884,038

TRANSCONDUCTANCE AMPLIFIER WITH TRANSFORMER COUPLED FORWARD FEED

Petar N. Miljanic, Gloucester, Canada, assignor to Canadian Patents and Development Limited-Societe Canadienne Des Brevets Et D'Exploitation Limitee, Ottawa, Canada

Filed Mar. 25, 1988, Ser. No. 173,630
Int. Cl.[4] H03F *3/50*
U.S. Cl. 330—165 **11 Claims**



1. The combination of a transconductance amplifier for emitting an output current to a load that is a replica of an input voltage, and means for enhancing the accuracy of such replica, said enhancing means comprising:

(a) a current comparator comprising

(i) first magnetic core means,

(ii) second magnetic core means,

(iii) a pair of ratio windings electro-magnetically coupled with both said core means, and

(iv) detection winding means electro-magnetically coupled with the first core means but not with the second core means,

(b) means connecting a first of said ratio windings in series with the output current of the transconductance amplifier,

(c) a resistor connected to the second of said ratio windings to form a first series circuit,

(d) means connecting such first series circuit across the input voltage of the transconductance amplifier whereby the current in said second ratio winding accurately reproduces the waveform of said input voltage, and

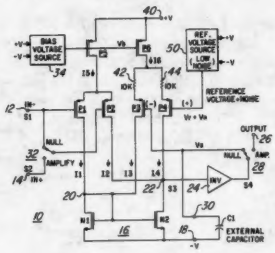
(e) a current source for injecting into the output current of the transconductance amplifier a current proportional to an error current in the detection winding means.

4,884,039

DIFFERENTIAL AMPLIFIER WITH LOW NOISE OFFSET COMPENSATION

Lawrence A. King, Grapevine, and Peter J. Andrews, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sep. 9, 1988, Ser. No. 242,451
Int. Cl.[4] H03F *3/45*
U.S. Cl. 330—253 **15 Claims**



1. A differential amplifier, comprising:

a pair of input transistors for receiving input signals to be amplified and providing first and second output currents to respective inputs of a load circuit for developing an output signal representative of a difference in said input signals; and

a linear offset correction circuit coupled to said load circuit and comprising:

a first source providing an offset correction voltage and a second source providing a reference voltage; and

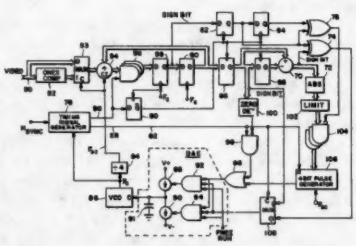
a pair of auxiliary transistors responsive to said reference and correction voltages for supplying third and fourth differentially related output currents to respective inputs of said load circuit for correcting offset errors of said amplifier.

4,884,040

SAMPLED DATA PHASE LOCKING SYSTEM

Russell T. Fling, Noblesville, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Continuation-in-part of Ser. No. 249,022, Sep. 26, 1988, abandoned. This application Mar. 17, 1989, Ser. No. 324,875
Int. Cl.[4] H03L *7/08*; H03D *13/00*
U.S. Cl. 331—1 A **21 Claims**



13. A method of locking a generated signal from a controllable signal generator to an applied signal, comprising:

sampling the applied signal at a particular phase of said generated signal to produce samples representing first and second quadrature phase related components of said applied signal;

accumulating said samples over predetermined intervals to

produce first and second sample sums representing said first and second components;

forming differences of said first sample sums from successive intervals;

generating a zero detection signal having a first state for said first sample sums being zero valued and at least a second state for said first sample sums being nonzero; and

combining signals representing said differences and said zero detection signal to develop a signal for controlling said controllable signal generator.

4,884,041

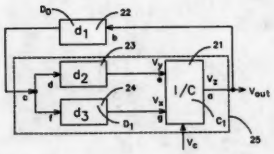
FULLY INTEGRATED HIGH-SPEED VOLTAGE CONTROLLED RING OSCILLATOR

Richard C. Walker, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 5, 1987, Ser. No. 58,477

Int. Cl.[4] H03B *5/00*

U.S. Cl. 331—57 **1 Claim**



1. A ring oscillator comprising:

an inverter/combination element having a pair of inputs and an output;

a first delay element having an input connected to the output of the inverter/combination element and having an output;

a second delay element having an input connected to the output of the first delay element and having an output connected to a first one of the inputs of the inverter/combination element;

a third delay element having an input connected to the output of the first delay element and having an output connected to a second of the inputs of the inverter/combination element; and

an output port connected to any internal connection between the other elements of this oscillator.

4,884,042

DUAL PORT VOLTAGE CONTROLLED EMITTER COUPLED MULTIVIBRATOR

Suresh Menon, and Enjeti Murthi, both of Sunnyvale, Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

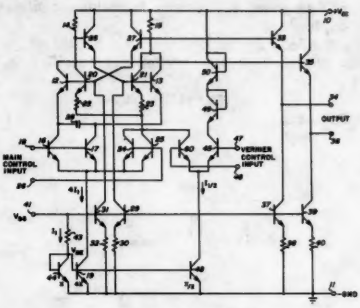
Filed Feb. 15, 1989, Ser. No. 311,493

Int. Cl.[4] H03K *3/282*

U.S. Cl. 331—113 R **6 Claims**

1. In an emitter coupled multivibrator circuit comprising a pair of differentially operated transistors, a capacitor coupled between the emitters of said pair of transistors, load means coupled between the collectors of said pair of transistors and a first power supply reference terminal, a pair of current sources coupled between said emitters of said pair of transistors and a second power supply terminal, a pair of emitter followers cross-coupled between the collectors and bases of said pair of transistors to provide oscillatory feedback therebetween, and a first modulation port for controlling the conduction of said current sources for varying the frequency of oscillation of said pair of transistors, the improvement comprising:

a first differential amplifier having differential input terminals coupled to the bases of said pair of transistors, differential outputs coupled to the collectors of said pair of transistors and a third constant current source coupled to pass the tail current in said first differential amplifier to said second power supply terminal; and



means responsive to the voltage of said first port for modulating said tail current in said differential amplifier differentially with respect to the currents in said pair of current sources.

4,884,043

HIGH-FREQUENCY GENERATOR

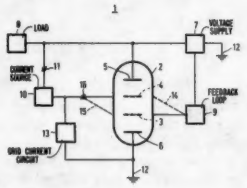
Christian S. A. E. Patron; Eugene J. Sowinski, and Aart P. Huben, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 12, 1988, Ser. No. 218,007

Claims priority, application Netherlands, Jul. 16, 1987, 8701678

Int. Cl.[4] H03B *5/10*; H05B *6/02*

U.S. Cl. 331—186 **13 Claims**



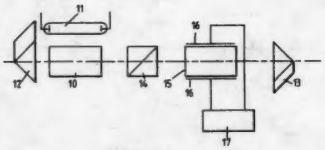
1. A high-frequency generator comprising a multigrid electron tube having at least one grid pair including a control grid and a screen grid, a tube supply circuit and a load each being connected to a main current path of the electron tube, a feedback loop for generating a high-frequency signal in the main current path, said feedback loop being connected to the main current path of the electron tube and to one of the grids of the grid pair, and a current source circuit connected to the remaining grid of the grid pair for defining the grid dissipation in the electron tube.

4,884,044

OPTICAL MODULATORS

Peter J. Heywood, and Richard A. Eggleston, both of Lothian, Scotland, assignors to Ferranti International Signal plc, Cheshire, England

Filed Aug. 23, 1988, Ser. No. 235,156
Claims priority, application United Kingdom, Sep. 9, 1987, 8721152
Int. Cl.[4] H01S 3/98
U.S. Cl. 330—4.3 9 Claims



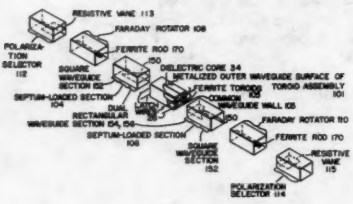
1. An optical modulator of the Q-switch type comprising:
a crystal of a material which exhibits the pyroelectric effect and having two opposed optical faces through which laser radiation may pass along a path; means to apply an electric field to the crystal ransverse to said path in order to switch said modulator; and
charge-dissipating means for dissipating any static electric charge built up on the two opposed optical faces of the crystal due to the pyroelectric effect.

4,884,045

FAST SWITCHING RECIPROCAL FERRITE PHASE SHIFTER

William K. Alverson, Dunwoody, and James A. Ruller, Decatur, both of Ga., assignors to Electromagnetic Sciences, Inc., Norcross, Ga.

Filed Jan. 19, 1988, Ser. No. 145,112
Int. Cl.[4] H01P 1/195
U.S. Cl. 333—158 35 Claims



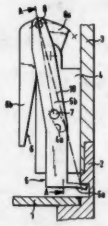
1. A fast switching phase shifter comprising:
a first input/output means for receiving forward and reverse propagating electromagnetic waves;
a waveguide coupled to said first input/output means;
aplurality of non-reciprocal phase shifters enclosed entirely within said waveguide, each of said phase shifters including a toroidal element; and
a second input/output means coupled to said waveguide for receiving forward and reverse propagating electromagnetic waves;
said first input/output means being operatively coupled to route forward propagating electromagnetic waves only to one of said phase shifters and to receive reverse propagating electromagnetic waves only from another one of said phase shifters and said second input/output means being operatively coupled to route reverse propagating electromagnetic waves only to said another one of said phase shifters and to receive rorward propagating electromagnetic waves only from said one of said plurality of phase shifters.

4,884,046

TRANSMITTER/ANTENNA BAY

Georg Spinner, Am Eichberg 12, 8152 Feldkirchen-Westerham, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,188
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727200
Int. Cl.[4] H01P 1/04
U.S. Cl. 333—260 15 Claims



1. Apparatus for locking the housing of a coaxial transmission line with the front panel of a transmitter/antenna bay for selectively connecting at least two coaxial lines of a plurality of coaxial lines via flange sockets incorporated in the front panel, said locking apparatus, comprising: locking means including a locking lever swingably mounted about a pivot pin fixed to the housing at a distance thereto and a hook hinged to said locking lever at a point of articulation, said hook being suitably supported to allow a swinging motion and a longitudinal displacement thereof for movement between a locking position in which said hook engages a collar of the flange socket and a disengaged position in which said hook is removed from the collar, wherein said hook and said locking lever move in opposite direction upon actuation of said locking lever, said point of articulation defining with the collar a line of action which extends on one side of said pivot pin in locking position and on the other side of said pivot pin is disengaged position.

4,884,047

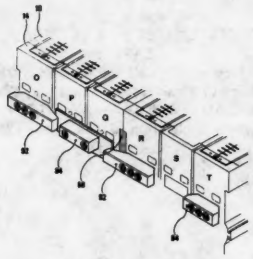
HIGH RATING MULTIPOLE CIRCUIT BREAKER FORMED BY TWO ADJOINED MOLDED CASES

Pierre Baginski, Grenoble; Jean-Pierre Nebon, St. Martin Le Vinoux, and Marc Bur, Grenoble, all of France, assignors to Merlin Gerin, France

Filed Dec. 5, 1988, Ser. No. 279,457
Claims priority, application France, Dec. 10, 1987, 87 17447
Int. Cl.[4] H01M 75/00
U.S. Cl. 335—10 5 Claims

1. A low-voltage multipole circuit breaker, for high current intensities, comprising a plurality of poles juxtaposed inside an insulating molded case whose side walls comprise reliefs, each pole comprising a pair of separable contacts, an arc chute and a pair of contact terminal pads connected to the separable contacts and protruding outwards from the case, the contact terminal pads being connected to connecting strips designed to be connected respectively to the phases of a mains system to be protected, a circuit breaker characterized in that it is formed by two adjoined standard multipole cases, comprising in common an operating bar of the poles, an operating mechanism of said bar, and an electronic trip device actuating said mechanism, a spacer being fixed to the opposite side walls of the two

cases, resin cold-cast between said opposite side walls providing fixing of the two cases, and at least one of the connecting



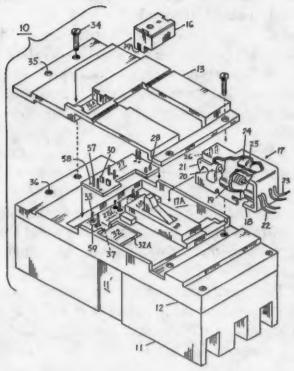
strips being connected to at least two adjacent twinned poles, electrically arranged in parallel.

4,884,048

MOLDED CASE CIRCUIT BREAKER CURRENT TRANSFORMER ASSEMBLY

Roger N. Castonguay, Terryville; Joseph M. Palmieri, Southington, and Graham A. Scott, Avon, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Jan. 18, 1989, Ser. No. 299,179
Int. Cl.[4] H02B *1/08*
U.S. Cl. 335—18 **10 Claims**



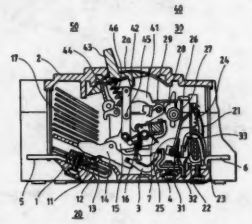
1. An electronic trip circuit interrupter comprising:
a molded plastic case and cover;
a pair of separable contacts under control of an operating mechanism for separating said contacts upon occurrence of an overcurrent condition through a protected circuit;
at least one current transformer within said case sensing circuit current through said contacts and having a plurality of upstanding pin connectors extending from a top surface;
a printed wire board containing a trip circuit arranged on one surface of said cover and including a corresponding plurality of thru-holes receiving said transformer pin connectors; and
means formed on an opposite surface of said cover facilitating passage of said transformer connectors through openings in said cover nd through said thruholes in said printed wire board.

4,884,049

CIRCUIT BREAKER OVERCURRENT TRIPPING DEVICE

Jun Oyama, and Naoshi Uchida, both of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Nov. 14, 1988, Ser. No. 270,334
Claims priority, application Japan, Dec. 29, 1987, 335383
Int. Cl.[4] H01H *75/08, 75/12*
U.S. Cl. 337—36 **1 Claim**



1. A circuit breaker overcurrent tripping device, comprising:
a bimetallic strip for conducting an electric current and configured to bend in response to a predetermined accidental increase in the electric current;
a fixed iron core having an open side, disposed and configured to accommodate the bimetallic strip;
a movable iron core pivotally supported adjacent the open side of said fixed iron core and magnetically attracted to said fixed iron core in response to the accidental increase of electric current;
a tripping mechanism responsive to the movement of said movable iron core toward said fixed iron core and the bending of said bimetallic strip;
a fixed contact point disposed adjacent the open side of said fixed iron core and electrically connected through a connecting wire to a load terminal;
a movable contact point fixed to said movable iron core for impinging on said fixed contact point, said movable contact point being further connected via a conductor wire to a fixed end of said bimetallic strip; and
means for increasing a magnetic field of the iron core in response to said accidental increase of electric current, said means including a flexible conductor wound at least once around said fixed iron core and electrically connected at opposite ends to a free end of said bimetallic strip and said load terminal.

4,884,050

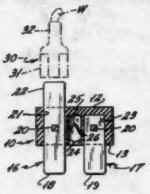
BLADE TERMINAL TAP FUSE

Emmett L. Kozel, Rte. 1, Box 206, Rockingham, N.C. 28379

Filed Jul. 18, 1988, Ser. No. 220,314
Int. Cl.[4] H01H *85/22*
U.S. Cl. 337—264 **11 Claims**

1. An electrically tappable miniature fuse to which an electrical conductor may be connected by way of an electrical connector comprising an electrically insulated housing having upper and lower ends, a pair of spaced and generally parallel electrically conductive blade elements mounted within said housing, an electrical fuse link extending between and connecting said pair of blade elements within said housing, each of said blade elements having a first end extending outwardly from said lower end of said housing, at least one of the said blade elements having an auxiliary end spaced from said end of said

blade elements and extending outwardly of said upper end of said housing whereby said auxiliary end provides an electrical



contact through the fuse to which the electrical connector may be selectively mounted.

4,884,051

SEMICONDUCTOR DIFFUSION TYPE FORCE SENSING APPARATUS

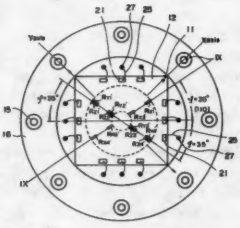
Junichi Takahashi, Yokohama; Daisuke Kosaka, Takarazuka; Hirotoshi Eguchi, Yokohama; Shoji Matsumoto. Minoo; Takashi Akahori, Yokohama; Hiroshi Yamazaki, Tokyo, and Kouji Izumi, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 5, 1988, Ser. No. 215,412

Claims priority, application Japan, Jul. 8, 1987, 62-170498; Sep. 18, 1987, 62-234042

Int. Cl.[4] G01L *1/22*; H01L *27/20*

U.S. Cl. 338—4 **43 Claims**



1. A semiconductor diffusion type force sensing apparatus comprising:

a plate-like semiconductor substrate formed by a single crystal material; and

a plurality of sensing elements each constituted by a substantially rectangular impurity-diffused region formed in the semiconductor substrate, said sensing element including a first group of sensing elements and a second group of sensing elements,

the sensing elements having an electric resistance variable in accordance with a deformation thereof due to an external force exerted on the semiconductor substrate,

said first group of sensing elements being aligned in a first direction such that a longitudinal direction of each of the sensing elements related to the first group coincides with a first crystal orientation of the semiconductor substrate having an extremal value of a longitudinal piezoresistance coefficient of the impurity-diffused region,

said second group of sensing elements being aligned in a second direction such that a longitudinal direction of each of the sensing elements related to the second group coincides with a second crystal orientation of the semiconductor substrate having an external value of a longitudinal piezoresistance coefficient of the impurity-diffused region,

said second direction being different from said first direction, the alignment of said first group of sensing elements being arranged so as to intersect the alignment of said second group of sensing elements.

4,884,052

CONTACT STRUCTURE FOR SLIDER POSITION SENSOR

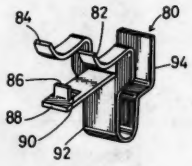
Kenji Eitoku; Mamoru Tateishi, and Kenji Hayashi, all of Obu, Japan, assignors to Aisan Kogyo Kabushiki, Obu, Japan

Filed May 26, 1988, Ser. No. 200,517

Claims priority, application Japan, May 29, 1987, 62-85389[U]; May 29, 1987, 62-85390[U]

Int. Cl.[4] H01C *1/012*

U.S. Cl. 338—202 **6 Claims**



1. A sliding contact slidingly moveable on an electrode in association with a sliding movement of a slider, comprising:

a sliding contact piece including

an elongated contact segment slidingly contacting said electrode and

a base plate formed at a base portion of said contact segment, said base plate having a mounting hole for engaging a first projection of said slider; and

an elongated snap member for positioning and fixing said sliding contact piece with respect to said slider,

said snap member mounted on said base plate of said sliding contact piece and extending in a direction substantially perpendicular to an extending direction of said contact segment,

said second snap member formed with first and second snap portions arranged in spaced relationship to each other in the extending direction of said snap member,

said first snap portion having a first mounting hole for engaging said first projection of said slider and a plurality of first snap segments formed around said first mounting hole, and

said second snap portion having a second mounting hole for engaging a second projection of said slider and a pair of cutouts continuing from said second mounting hole at opposite positions in the extending direction of said snap member to form a pair of opposed second snap segments.

4,884,053

SURFACE MOUNT WIREWOUND RESISTOR AND METHOD OF MAKING THE SAME

Gary E. Bougger, Columbus, Nebr., assignor to Dale Electronics, Inc., Columbus, Nebr.

Filed Aug. 26, 1988, Ser. No. 236,718

Int. Cl.[4] H01C *1/034*

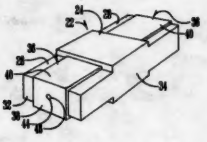
U.S. Cl. 338—275 **8 Claims**

1. A surface mount resistor, comprising,

a substantially hard plastic rectangularly-shaped body member having substantially flat and parallel upper and lower surfaces, opposite sides, and opposite ends,

an electrical resistance element embedded in said body member and having a pair of spaced terminal ends which extend through said body member and terminate substantially at the exterior surface of said body member,

and a pair of spaced electrical terminal pads secured to the exterior surface of said body member with one each of



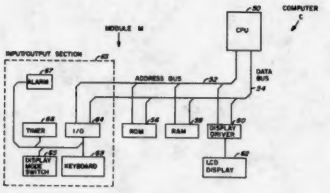
said terminal pads being in electrical contact with said one each of said terminal ends.

4,884,054

SELF-CONTAINED MOTOR VEHICLE MAINTENANCE INTERVAL MONITOR

John H. Moon, Sr., 3914 Peru Cir., Pasadena, Tex. 77504

Filed Aug. 18, 1988, Ser. No. 233,620
Int. Cl.[4] G08B *1/00*; B60Q *1/00*
U.S. Cl. 340—309.15 **18 Claims**



1. A vehicle maintenance interval monitor, comprising:

means for storing a plurality of maintenance intervals for the vehicle;

means for setting each of the plurality of maintenance intervals for the vehicle;

means for storing an estimated vehicle speed value;

means for setting the estimated vehicle speed value;

means for determining the actual date and time;

means for storing an actual date and time as a stored date and time;

means for retrieving the stored date and time, for obtaining an actual date and time from the date and time determining means, and for determining a change in the actual date and time by subtracting the retrieved stored date and time from the obtained actual date and time;

means for retrieving the stored estimated vehicle speed value, for obtaining the determined change in the actual date and time, and for calculating an estimated distance traveled by multiplying the determined change in the actual date and time by the stored estimated vehicle speed value;

means for retrieving each of the maintenance intervals, for obtaining the estimated distance traveled, and for comparing the estimated distance traveled with each of the maintenance intervals; and

means responsive to the maintenance interval comparison means for indicating when the estimated distance traveled has exceeded one of the maintenance intervals,

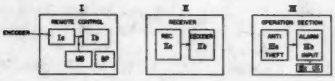
wherein the date and time determining means, the date and time storing means, the date and time change determining means, the estimated distance traveled means, the comparing means and the indicating means are active independent of the vehicle running or moving status.

4,884,055

ANTITHEFT SYSTEM

Serafino Memmola, Varese, Italy, assignor to Delta Elettronica S.p.A., Varese, Italy

Filed Nov. 24, 1987, Ser. No. 124,885
Claims priority, application Italy, Dec. 3, 1986, 83667 A/86
Int. Cl.[4] B60R *25/00*
U.S. Cl. 340—426 **21 Claims**



1. Antitheft system for a vehicle provided with an engine, engine operating control means having a first state in which the engine is operable and a second state in which the engine is disabled, and a door movable between an open position and a closed position, the antitheft system having an armed condition and an unarmed condition and comprising:

means for generating a control signal; and

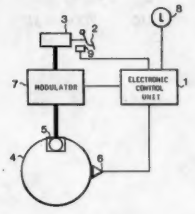
means on the vehicle responsive to said control signal, said responsive means being operable to sense the state of the engine control means, the position of the door and the condition of the antitheft system, and said responsive means further being operable to: (i) arm the antitheft system in response to said control signal when the antitheft system is unarmed, the door is closed and the engine control means is in the second state, (ii) disarm the antitheft system in response to said control signal when the antitheft system is armed, and (iii) produce an alarm condition in response to said control signal when the engine control means is in the first state, the door is open and the antitheft system is unarmed, the production of said alarm condition including converting the engine control means to the second state to disable the engine.

4,884,056

SYSTEM FOR DISPLAYING TROUBLE IN AN ELECTRONIC CONTROL SYSTEM OF A MOTOR VEHICLE

Seiichi Ishizeki, Ashikaga, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 16, 1988, Ser. No. 232,796
Claims priority, application Japan, Sep. 7, 1987, 62-223550
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 340—453 **4 Claims**



1. A system for displaying trouble in an electronic control system of a motor vehicle having detecting means for detecting failure in the electronic control system, and a warning lamp for displaying a detected failure, the system comprising:

means for detecting nature of a failure in the electronic control system;

comparing means for comparing the pattern of a pulse signal generated by operating a brake pedal switch in the vehicle with a predetermined stored pattern and for producing a

failure signal representing the nature of the detected failure; and

display means responsive to the failure signal for intermittently lighting the warning lamp in accordance with a predetermined pattern representing the nature of the failure.

4,884,057

PUSH BUTTON AUTOMATIC TRANSMISSION CONTROL DEVICE

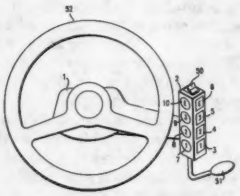
Francois Leorat, Versailles, France, assignor to Regie Nationale des Usines Renault, Boulogne Billancourt, France

Filed Jun. 22, 1987, Ser. No. 64,469

Claims priority, application France, Jun. 20, 1986, 86 08906

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 340—456 **12 Claims**



1. An electromechanical control device for selecting and engaging a plurality of gears, located in an automatic transmission of a motor vehicle, while said motor vehicle is operated in a drive position comprising:

a plurality of push buttons positioned so that a driver of said motor vehicle can touch said plurality of push buttons with his fingers while holding a steering wheel;

a digital control means for engaging a particular gear of said plurality of gears corresponding to a driving mode selected by said driver when said driver pushes a designated push button of said plurality of push buttons, said plurality of push buttons being connected to said digital control means, and said digital control means functioning only when said motor vehicle is in a drive position.

4,884,058

COMBINATION INDICATOR APPARATUS FOR AUTOMOTIVE VEHICLE

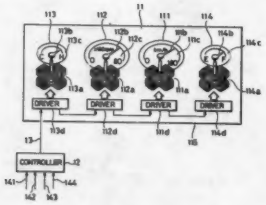
Kimihiko Ikeda, Shizuoka, Japan, assignor to Yazaki Corporation, Japan

Filed Sep. 9, 1988, Ser. No. 242,347

Claims priority, application Japan, Sep. 11, 1987, 62-226564

Int. Cl.[4] B60Q *1/00*; G01R *1/00*

U.S. Cl. 340—461 **4 Claims**



1. A combination indicator apparatus for an automotive vehicle provided with a plurality of sensors for sensing various information related to the vehicle, comprising:

(a) an indicator assembly including:

(1) a plurality of analog information indicators of the same type, for indicating different information, independently; and

(2) a plurality of driver circuits of the same type, each provided with a digital shift register and each associated with one of said analog information indicators, for driving said analog information indicator independently through said shift register; and

(b) a single controller, disposed remote from said indicator assembly, for receiving various information sensed by the sensors and transmitting various digital drive data indicative of the received information to said driver circuits to indicate various information on said analog information indicators via said driver circuits, independently in serial time sharing mode.

4,884,059

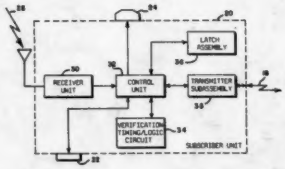
APPARATUS AND METHOD FOR REPORTING VERIFICATION TESTING OF A PERSONAL EMERGENCY RESPONSE SYSTEM

L. Dennis Shapiro, Chestnut Hill, Mass., assignor to Lifeline Systems, Inc., Watertown, Mass.

Filed Dec. 27, 1988, Ser. No. 190,470

Int. Cl.[4] G08B *29/00*

U.S. Cl. 340—514 **16 Claims**



1. An apparatus for reporting verification testing of a personal emergency response system including a remote subscriber station capable of transmitting messages over a communications link to a central station, comprising:

portable activator means selectively operable for generating an activating signal at the subscriber station;

subscriber unit means disposed within the subscriber station and normally operative in response to said activating signal for transmitting one or more messages over the communications link to the central station;

latch assembly means coupled to said subscriber unit means and operative in response to said activating signal for indicating operational status of said subscriber unit means and said portable activator means in combination during a predetermined period of time; and

verification timing/logic means for clocking said predetermined period of time and operative in response to expiration of said predetermined period of time for effecting activation of said subscriber unit means to poll said latch assembly means to determine said operational status thereof and to transmit a system test message indicative of said operational status of said latch assembly means to the central station.

4,884,060

MULTI-STATE SELECTION SWITCH FOR A PERSONAL EMERGENCY RESPONSE SYSTEM

L. Dennis Shapiro, Chestnut Hill, Mass., assignor to Lifeline Systems, Inc., Watertown, Mass.

Filed Dec. 27, 1988, Ser. No. 290,469

Int. Cl.[4] G08B *29/00*

U.S. Cl. 340—514 **16 Claims**

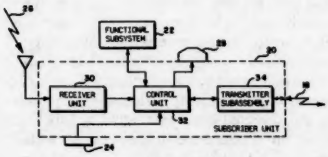
1. A personal emergency response system including a subscriber station capable of transmitting messages over a communications link to a central station, comprising:

portable activator means selectively operable for generating an activating signal;

functional subsystem means operative in response to said activating signal for performing a predetermined function;

subscriber unit means disposed within the subscriber station and normally operative in response to said activating signal for transmitting one or more messages over the communications link to the central station; and

multi-state selection means coupled to said subscriber unit



means and selectively actuatable for selectively operating said subscriber unit means in HOME and AWAY modes;

operation of said subscriber unit means in said HOME mode causing said subscriber unit means to be normally operative in response to said activating signal to transmit one or more messages over the communications link to the central station; and

operation of said subscriber unit means in said AWAY mode causing activation of the functional subsystem means to perform the predetermined function.

4,884,061

CAPACITIVE APPARATUS TO MONITOR THE INTEGRITY OF A WALL

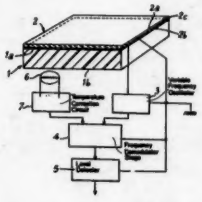
Christophe Genevois, Dijon, France, assignor to Axytel S.A., Dijon, France

Filed May 26, 1988, Ser. No. 199,174

Claims priority, application France, May 27, 1987, 87 07530

Int. Cl.[4] G08B *13/22*

U.S. Cl. 340—550 **11 Claims**



1. An apparatus for verifying the integrity of a wall having internal and external surfaces and adapted to cause an intervention when an aggressive act is committed against the wall, said apparatus comprising,

(a) a sensor mounted on one of the external or internal surfaces of the wall, said sensor being a condenser having a surface area substantially matching the shape of the wall and having a first plate connected to the wall and a second plate connected to ground;

(b) an electronic surveillance circuit on the internal side of the wall comprising a variable frequency oscillator having a control input connected to said first plate;

(c) means for detecting variation of frequency of an output signal of the variable frequency oscillator resulting from a variation in capacitance of the condenser, and for emitting a signal when an aggressive act on the wall causes a variation in surface area of the condenser which causes a variation in capacitance of the condenser.

4,884,062

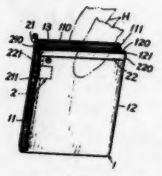
ALARMING WALLET ACTUATED BY A PICKPOCKET'S FINGERS

Wen-Tsung Lin, and Sheng-Chuan Chen, both of P.O. Box 30-443, Taipei, Taiwan

Filed Oct. 11, 1988, Ser. No. 256,312

Int. Cl.[4] G08B *13/14*

U.S. Cl. 340—571 **8 Claims**



1. An alarming wallet comprising:

a wallet having two leaves foldable upon each other; and an alarming circuit including: an alarm switch having two contactors respectively formed on two outer surfaces of the two leaves of the wallet, a transistor connected to and actuated by said alarm switch, a sounding integrated circuit connected with a piezoelectric buzzer and connected to a power source through said transistor, whereby upon a withdrawal of said wallet from an owner's pocket, purse or handbag by a pickpocket, the pickpocket's fingers will touch said two contactors of said alarm switch to render said transistor conductive to trigger said sounding integrated circuit and said piezoelectric buzzer for alerting a possible theft of said wallet.

4,884,063

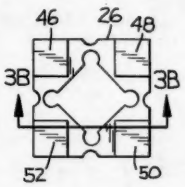
DUAL STATUS MAGNETIC MARKER HAVING MAGNETICALLY BIASABLE FLUX COLLECTORS FOR USE IN ELECTRONIC ARTICLE SURVEILLANCE SYSTEMS

Russell W. Church, Oakdale, and Eugene C. Heltemes, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 151,063, Feb. 1, 1988, Pat. No. 4,825,197. This application Jan. 17, 1989, Ser. No. 297,334

Int. Cl.[4] G01B *13/18*

U.S. Cl. 340—572 **5 Claims**



1. A dual status marker for use in an electronic surveillance system in which there is applied a magnetic field, said marker comprising at least one center section formed of a low coercive force, high permeability material, flux collectors proximate to each end of each said center section, and means associated with said flux collectors capable of being remanently magnetized wherein when said means is unmagnetized said center section and associated flux collectors in concert respond with a characteristic signal when subjected to a said applied field, and when said means is magnetized, localized fields result which bias said certain flux collectors and results in an altered response of the marker to said applied field.

4,884,064

INTRUDER DETECTION AND CONTROL APPARATUS

Adrian P. Meehan, Uckfield, England, assignor to Rentokil Limited, West Sussex, England

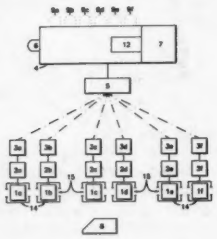
PCT No. PCT/GB86/00493, § 371 Date Apr. 16, 1987, § 102(e) Date Apr. 16, 1987, PCT Pub. No. WO87/01011, PCT Pub. Date Feb. 26, 1987

PCT Filed Aug. 19, 1986, Ser. No. 52,738

Claims priority, application United Kingdom, Aug. 20, 1985, 8520769

Int. Cl.[4] G08B *23/00*

U.S. Cl. 340—573 16 Claims



1. Apparatus for detecting whether or not free-ranging rodent pests are present in an area under surveillance, which apparatus is free from means providing an attractant material and comprises a plurality of sensors distributed over the said area, each sensor having associated therewith an enclosure or channel which a rodent can enter and being capable of sensing whether or not a rodent is present in the enclosure or channel associated therewith, and an indicating means for indicating whether or not a rodent has been sensed by any of the sensors, the indicating means being operatively coupled to each of the sensors and each sensor having associated therewith signaling means for signaling to the indicating means when a rodent has been sensed by that sensor, and the indicating means including recording means and being capable of recording and indicating the fact that a rodent has been sensed.

4,884,065

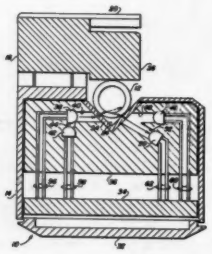
MONITOR FOR DETECTING TUBE POSITION AND AIR BUBBLES IN TUBE

Ronald J. Crouse, McKinney; Norris A. Lauer, Mesquite, and David A. Pinto, Frisco, all of Tex., assignors to Pacesetter Infusion, Ltd., Sylmar, Calif.

Filed Jun. 13, 1988, Ser. No. 206,232

Int. Cl.[4] G08B *17/10*

U.S. Cl. 340—632 19 Claims



1. A device for detecting the presence of air in hollow cylindrical tubing, comprising:

means for mounting a plurality of components therein, said mounting means including a recessed groove therein, said recessed groove for receiving a portion of the tubing;

a light source located in said mounting means on one side of said recessed groove, light from said light source being directed onto said tubing when the tubing is located in said recessed groove;

a tube/no tube light sensor located in said mounting means on the other side of said recessed groove from said light source, said tube/no tube light sensor receiving light from said light source whenever tubing is not located in said recessed groove, said tube/no tube light sensor receiving substantially no light from said light source whenever tubing is located in said recessed groove; and

a liquid in tube light sensor located in said mounting means, light from said light source which enters tubing located in said recessed groove being reflected off the inside of the tubing and directed onto said liquid in tube light sensor whenever air is contained in the tubing, substantially no light entering tubing located in said recessed groove being reflected off the inside of the tubing and being directed onto said liquid in tube light sensor whenever fluid is contained in the tubing, light entering tubing located in said recessed groove instead entering the fluid contained in the tubing.

4,884,066

DETERIORATION DETECTOR SYSTEM FOR CATALYST IN USE FOR EMISSION GAS PURIFIER

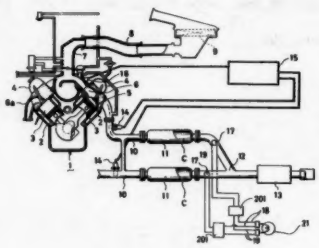
Shigeru Miyata, and Toshiki Sawada, both of Nagoya, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Nov. 17, 1987, Ser. No. 121,455

Claims priority, application Japan, Nov. 20, 1986, 61-179042[U]

Int. Cl.[4] G08B *17/10*

U.S. Cl. 340—633 4 Claims



1. A deterioration detector system for catalyst used in an emission gas purifier comprising:

(a) a passageway through which exhaust gas from an internal combustion engine passes in contact with a catalyst to facilitate reducing and oxidizing reactions among gaseous components, hydrocarbon, carbon monoxide and nitrogen oxide;

(b) a sensor placed in said passageway at a position downstream of said catalyst against a flow of said exhaust gas so as to generate an output substantially in direct proportion to air-fuel ratio of said exhaust gas, said sensor producing said output, the magnitude of which changes in a relationship with that of theoretical air-fuel ratio such that the greater the deterioration of said catalyst, the more removed the output of said sensor is from said theoretical air-fuel ratio; and

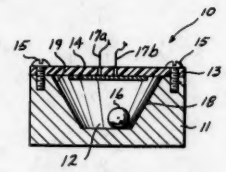
(c) an annunciator arranged including a switching module (210) to be activated when said output level of said sensor reaches at a predetermined level.

4,884,067

MOTION AND POSITION SENSING ALARM

Ken Nordholm, and Bud Eyers, both of Vancouver, Canada, assignors to Talkie Tooter (Canada) Ltd., Vancouver, Canada

Filed Aug. 13, 1987, Ser. No. 84,959
Int. Cl.[4] G08B 19/00
U.S. Cl. 340—686 43 Claims



1. A motion and position sensing switch comprising:
an enclosure having a cavity;
a contact-making element resting in said cavity;
a plate having a conductive circuit thereon that caps said cavity;
said cavity having a conductive region near said plate, said plate and said conductive circuit being electrically isolated from said conductive region, wherein, when said enclosure pivots to a predetermined position about a horizontal axis, said contact-making element resting in said cavity moves to make contact between said conductive region and said conductive circuit; and,
said conductive circuit comprising first and second conductive areas separated by a nonconductive region such that when said contact-making element makes contact between said first conductive area and said conductive region of said cavity, said switch is in a first state and when said contact-making element makes contact between said second conductive area and said conductive region of said cavity, said switch is in a second state.

4,884,068

MULTIPLE DISPLAY SYSTEM

Stephen E. Matheny, 1049 Willow Grove, Altamonte Springs, Fla. 32701, and Gary W. Orwig, 2216 Conifer Ave., Winter Park, Fla. 32792

Filed Sep. 12, 1986, Ser. No. 906,801
Int. Cl.[4] G09G 1/00
U.S. Cl. 340—707 12 Claims

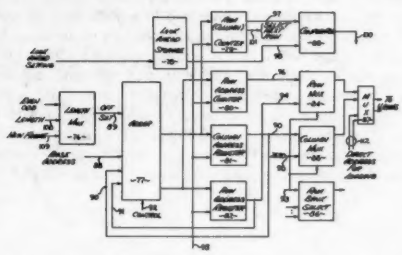
1. A multiple display system comprising:
a microcomputer having a mother board having a plurality of expansion slots therein and connected to a keyboard;
a plurality of display cards attached to said mother board and being operatively attached to each other;
a plurality of displays, one display being attached to each display card for operation thereby:
a synchronization generator card attached to one slot of said mother board for synchronizing said plurality of display cards;
a pointer device attached to said microcomputer for actuating each of said plurality of displays;
means for recognizing which display said pointer device is being used upon and to operate a plurality of displays with the pointer on any one of said displays; and
memory means for storing and retrieving analogue and digitized picture files and information and coordinate text on said stored analogue and digitized picture files, said memory means being coupled to said microcomputer having a plurality of display cards for displaying the stored analogue and coordinate digitized picture files and text.

4,884,069

VIDEO APPARATUS EMPLOYING VRAMS

Tobin E. Farand, Mountain View, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.

Filed Mar. 19, 1987, Ser. No. 27,847
Int. Cl.[4] G06F 13/00
U.S. Cl. 340—799 12 Claims



11. In a video apparatus for providing video data for a display when said apparatus is coupled to a computer which includes a central processing unit and a main memory, an improvement comprising:
a plurality of video random-access memories each of which includes a memory array which is addressed by a row address and a shift register which is addressed by a column address;
addressing means for providing said row address and column address for transfer of said video data directly from said memory array to said shift register;
detection means for providing a first signal prior to the end of the shifting of the data from said shift registers, said first signal initiating a time sequence for transfer of said video data from said memory arrays directly to said shift registers in said video random-access memories, thereby permitting either a non-integer or integer number of scan lines per row of said memory array, said detection means provides said first signal when said shift register has a certain number of bits of data remaining and said certain number of bit is programmable; and
control means for providing second signals to said video random-access memories when said first signal is received from said detection means;
said video random-access memories being addressed by said addressing means.

4,884,070

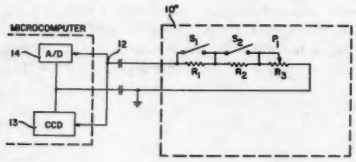
METHOD AND APPARATUS FOR MULTIPLEXING SWITCH SIGNALS

Blake Hannaford, South Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Apr. 4, 1988, Ser. No. 176,871

Int. Cl.[4] H04Q 9/00

U.S. Cl. 340—825.78 4 Claims



1. A system for multiplexing switch state signals from a device to a utilization system over a single conductor, comprising a series resistor network at said device, said network having n weighted resistors in series in which the resistances of said resistors are functions of different powers of the same base, each resistor except one having a switch in parallel therewith for bypassing it when the switch is closed, a source of constant current with internal resistance connected by said single conductor between circuit ground and one terminal of said series resistor network, a connection between a second terminal of said series resistor network opposite said one terminal and said circuit ground, and means connected to a node between said single conductor and said utilization device for converting the analog voltage at said device to a digital representation of the state of said switches in parallel with said resistors, said one resistor without a switch parallel therewith comprising a potentiometer connected in series with other ones of said n weighted resistors, said potentiometer being adjustable between a maximum resistance that is a function of the lowest power of the same base and a minimum resistance equal to zero.

4,884,071

WELLBORE TOOL WITH HALL EFFECT COUPLING

Mig A. Howard, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex.

Continuation-in-part of Ser. No. 1,286, Jan. 8, 1987, Pat. No. 4,788,544. This application Nov. 28, 1988, Ser. No. 276,722

The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.

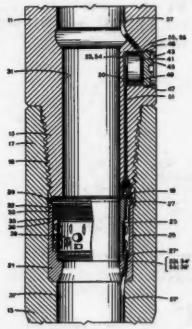
Int. Cl.[4] G01V 1/00

U.S. Cl. 340—854 10 Claims

1. An improved wellbore tool for coupling to a drill string at a threaded junction and adapted for use in a wellbore during drilling, comprising:

a sensor disposed in said wellbore tool for sensing a downhole condition and producing a data signal corresponding thereto; and

a Hall Effect coupling transmitter means, carried by the wellbore tool and coupled to said sensor, for generating a magnetic field in response to said data signal provided by said sensor and transmitting data from said Hall Effect coupling transmitter means to a Hall Effect coupling receiver carried by said drill string and disposed across said threaded junction from said wellbore tool, wherein data is transmitted across said threaded junction without



requiring an electrical connection at said threaded junction.

4,884,072

DEVICE FOR PHOTOGRAPHIC MONITORING OF CROSS-ROADS

Heinrich Horsch, Pfaffenberger Weg 224, 5650 Solingen 1, Fed. Rep. of Germany

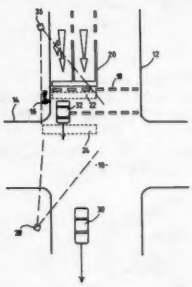
PCT No. PCT/EP86/00467, § 371 Date Jun. 8, 1987, § 102(e) Date Jun. 8, 1987, PCT Pub. No. WO87/01847, PCT Pub. Date Mar. 26, 1987

PCT Filed Aug. 7, 1986, Ser. No. 50,769

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 3532527

Int. Cl.[4] G01D 3/00

U.S. Cl. 340—937 4 Claims



1. Device for photographic monitoring of an intersection controlled by traffic lights comprising:

(a) a photographic camera the field of view of which covers the intersection,

(b) a first sensor which responds to a vehicle moving into the intersection beyond a first position and which provides a sensor signal,

(c) means for generating a stop phase signal depending on the traffic lights being switched to stop phase,

(d) a camera-triggering device, which is arranged to be controlled by triggering signals to trigger the photographic camera,

(e) signal processing means to which the sensor signal and the stop phase signal are applied for providing a first triggering signal for triggering a first exposure of the

camera, when a sensor signal appears during the duration of the stop phase signal,

(f) and a second sensor arranged to apply a second sensor signal to the signal processing means to provide a second triggering signal delayed with respect to the first triggering signal for triggering a second exposure,

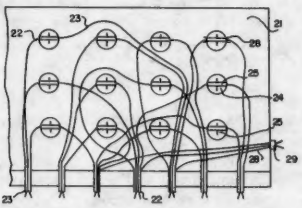
(g) the second sensor is located within the intersection and responds to the passage of the vehicles through a second position located in straight direction behind the first position.

4,884,073

INCREASED SENSITIVITY OPTICAL KEYBOARD

Alain Souloumiac, 29, rue du General Brunet, F-75019 Paris, France

Filed Dec. 23, 1987, Ser. No. 143,162
Claims priority, application France, Apr. 25, 1986, 86 06067
Int. Cl.[4] H03M *11/00*
U.S. Cl. 341—31 **10 Claims**



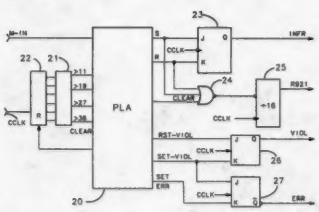
1. A matrix-scanning optical keyboard comprising a logical matrix of optical paths between light inlets and light outlets, with keys being disposed on each optical path connecting an inlet to an outlet in such a manner that depressing a key causes a change which is detectable by a scanning driver circuit connected to said light inlets and outlets in order to register such changes affecting each inlet-to-outlet coupling by cyclically injecting an interrogation signal into each inlet in turn and by inspecting each outlet for the presence of possible modifications thereat opto-electronic transducers connected to the scanning driver circuit and photodetectors at the outlets, said keyboard being characterized by the fact that it includes means which are capable for a given emission level of increasing the sensitivity of said scanning driver circuit to light arriving at said outlets.

4,884,074

METHOD AND APPARATUS FOR ENCODING AND DECODING BINARY INFORMATION

Patrick Nourry, Echirolles; Jacques Husser, Eybens, and Pierre-Yves Thoulon, Grenoble, all of France, assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 28, 1987, Ser. No. 90,499
Claims priority, application France, Oct. 15, 1986, 8614572
Int. Cl.[4] H03M *5/12*
U.S. Cl. 341—70 **1 Claim**



1. A method for encoding and decoding successive information trains coded according to the Manchester code, that is a serial code in which each information bit is transmitted as the succession during a determined time interval of a first level and a second level for a "1" and the succession during the same time interval of a second level and a first level for a "0," wherein, during the encoding, each information train is preceded by a heading having a duration of two determined time intervals during which a code violation is carried out, characterized in that:

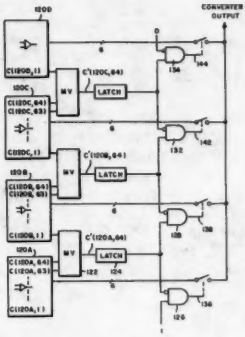
during a duration longer than a determined time interval, the coded signal is at the same level, and wherein, at the decoding, this longer time duration is detected for finding said heading, said violation being comprised of a first level during a time interval followed with a Manchester "1" during the following time interval, whereby said coded signal is at the first level during at least one and a half time intervals.

4,884,075

DECODING CIRCUIT FOR FLASH-TYPE ANALOG-TO-DIGITAL CONVERTER

Christopher W. Mangelsdorf, Reading, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Filed May 19, 1988, Ser. No. 196,035
Int. Cl.[4] H03M *1/36*
U.S. Cl. 341—159 **11 Claims**



1. A parallel type analog-to-digital converter for converting an input analog signal to a corresponding digital form, comprising:

a. a voltage divider providing a plurality of N voltage divider taps;

b. a plurality of comparators, each comparator having first and second inputs and an output;

c. one of the first and second inputs of each comparator being connected to a respective one of the voltage divider taps and the other of the comparator inputs being connected to receive the input analog signal; and

d. means for generating for each comparator "n", where n ranges from 0 to N, a corrected comparator output C'(n) in response to the output C(n) of comparator n and the outputs of comparators n+1 and n−1, where comparators n−1, n and n+1 are connected to consecutive electrically adjacent taps of the voltage divider, such that

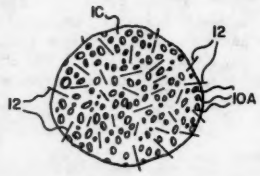
$$C'(n) = C(n-1)\,C(n) + C(n)\,C(n+1) + C(n-1)\,C(n+1).$$

4,884,076

FOAM SUPPORTED ELECTROMAGNETIC ENERGY REFLECTING DEVICE

Richard F. Schneeberger, Snyder, and Charles K. Akers, Williamsville, both of N.Y., assignors to Calspan Corporation, Buffalo, N.Y.

Filed Sep. 29, 1982, Ser. No. 427,087
Int. Cl.[4] G01S 7/36
U.S. Cl. 342—5 9 Claims



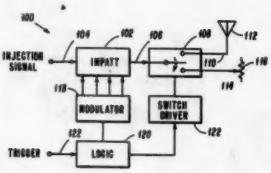
1. An electromagnetic energy reflecting decoy comprising a solidified foam mass of a volume similar to that of an object to be simulated and having a multitude of discrete electrically conducting elements embedded therein for reflecting energy in the radar frequency ranges, said elements having a length approximately equal to one-half the wave length of the electromagnetic energy to be reflected thereby and being dispersed throughout said mass in an approximately uniform distribution.

4,884,077

WEATHER RADAR TEMPERATURE CONTROLLED IMPATT DIODES CIRCUIT AND METHOD OF OPERATION

Don L. Landt, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jan. 27, 1988, Ser. No. 148,747
Int. Cl.[4] H04B 6/66
U.S. Cl. 342—202 2 Claims



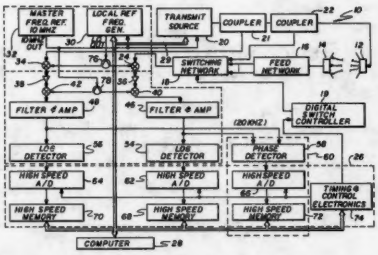
1. A circuit for generating a pulsed RF signal comprising:
a. means for generating an RF signal;
b. means for switching the RF signal from an antenna to a load;
c. means for manipulating said means for switching so that said means for generating an RF signal is able to generate a pulsed RF signal having a plurality of intervals therein during which no RF signal is generated, the pulsed signal emanating from the antenna by switching the RF signal from the antenna to the load, while providing for heating of said means for generating an RF signal during said plurality of intervals.

4,884,078

ANTENNA TEST AND MEASUREMENT SYSTEM

Theodore S. Fishkin, Lawndale; Mark Skidmore, Long Beach, and Peter Dimitrijevic, Redondo Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 1, 1986, Ser. No. 891,828
Int. Cl.[4] H01Q 3/00
U.S. Cl. 342—360 3 Claims



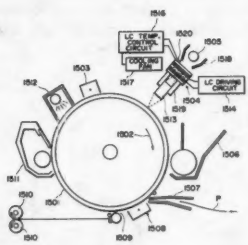
1. An antenna test and measurement system for use in far field and near field antenna test ranges comprising:
a transmit antenna;
means for providing a test signal to said transmit antenna and initiating the transmission thereof;
a receive antenna adapted to receive said test signal transmitted by said transmit antenna;
means for detecting the amplitude of the received test signal;
an open loop phase detector for measuring the phase of the received test signal relative to a reference signal; and
means for detecting the amplitude of the reference signal.

4,884,079

IMAGE FORMING APPARATUS AND DRIVING METHOD THEREFOR

Hiroshi Inoue, Kawasaki; Satoshi Omata, Tokyo; Yoshiyuki Osada, Yokosuka; Yutaka Inoue, Urawa; Tadashi Yamakawa, Yokohama, and Hiroshi Satomura, Hatogaya, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 724,690, Apr. 18, 1985, abandoned.
This application Jan. 19, 1989, Ser. No. 300,698
Claims priority, application Japan, Apr. 25, 1984, 59-83286; May 8, 1984, 59-91466; May 14, 1984, 59-96052
Int. Cl.[4] G01D 15/14; G02F 1/13
U.S. Cl. 346—1.1 39 Claims



1. In an image forming apparatus comprising an exposure light source, a printer head which comprises a plurality of microshutters arranged in at least one line and each controlling the transmission or interruption of light from said exposure light source, and an image bearing member so disposed to be

irradiated with light signals transmitted through the printer head; the improvement wherein

each of said plurality of microshutters is connected to one of a plurality of thin film transistors,

said plurality of thin film transistors are divided into a plurality of groups each comprising a prescribed number of thin film transistors which are connected in common to one source line and are connected separately to different gate lines; and

each of said different gate lines is commonly connected to a plurality of thin film transistors each belonging to one of said plurality of groups.

4,884,080

COLOR IMAGE PRINTING APPARATUS

Shuzo Hirahara, Yokohama; Hitoshi Nagato; Kazuhiko Higuchi, both of Kawasaki; Kiyoshi Yamada, Chigasaki; Tadayoshi Ohno, Kawasaki; Tsutomu Kanai, Yokohama, and Toshikazu Matsui, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

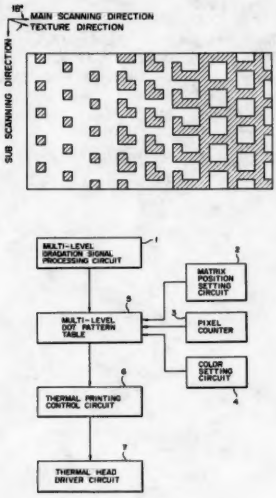
Continuation-in-part of Ser. No. 821,954, Jan. 24, 1986, Pat. No. 4,724,446. This application Jun. 2, 1987, Ser. No. 56,763

Claims priority, application Japan, Jan. 31, 1985, 60-16768; Jun. 28, 1985, 60-142108; Sep. 24, 1985, 60-208823; Jun. 2, 1986, 61-127616

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.[4] G01D *15/10*; H04N *1/23*; G03C *5/00*

U.S. Cl. 346—46 9 Claims



1. A color image printing apparatus comprising:

dot printing means for printing dots of at least two colors on a printing medium; and

control means for controlling said dot printing means such that only a predetermined dot or dots in accordance with a density of each pixel in units of colors in a dot matrix corresponding to one pixel are printed,

wherein positions of printed dots in the dot matrix are determined such that angles of two texture directions of the printed dots which are generated upon printing of pixels arranged in a two-dimensional manner are different for each color.

4,884,081

MAGNETIC INK AND METHOD OF PRINTING

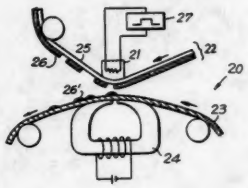
Hitoshi Fukushima; Katsumori Takei; Kohei Iwamoto, and Hiroto Nakamura, all of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,482

Claims priority, application Japan, May 29, 1987, 62-133871

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—74.6 20 Claims



1. A heat-fusible magnetic ink, comprising:

a heat-fusible binder including magnetic particles dispersed in the binder; and

an effective amount of surface tension control material dispersed in the binder for lowering the surface tension of the ink in its molten state to less than about 20 dynes/cm.

4,884,082

COLOR IMAGE RECORDING APPARATUS

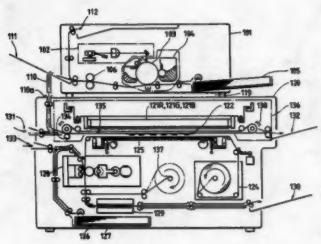
Takakuni Senoda; Kazunori Tanabe; Morikazu Iwase; Kazuo Sangyoji, all of Nagoya, and Tokunori Kato, Ichinomiya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Apr. 21, 1988, Ser. No. 184,576

Claims priority, application Japan, Apr. 24, 1987, 62-102182; Apr. 28, 1987, 62-105843; Jul. 17, 1987, 62-110376[U]; Jul. 24, 1987, 62-186138; Aug. 26, 1987, 62-212329; Sep. 18, 1987, 62-235973

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—105 11 Claims



1. An image recording apparatus comprising:

a monochromatic printer for producing mask members;

a color printer for exposing a photosensitive recording medium to light through said mask members to form color latent images on the photosensitive recording medium and developing the color latent images into a visibile color image; and

means for introducing the mask members from said monochromatic printer selectively into said color printer.

4,884,083

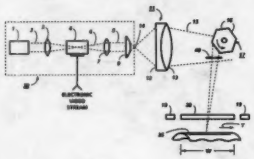
PRINTER COMPENSATED FOR VIBRATION-GENERATED SCAN LINE ERRORS

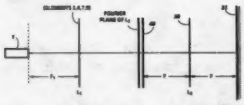
Robert P. Loce, Rochester, and William L. Lama, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 3, 1988, Ser. No. 252,618

Int. Cl.[4] G01D *15/14;* G02B *27/42*

U.S. Cl. 346—108 **4 Claims**





1. A laser printing system comprising means for generating a beam of high intensity light, a moving recording medium sensitive to said high intensity light, optical means comprising a pluality of optical elements interposed between said light generating means and said recording medium and including a cylindrical lens positioned in proximity to said recording media, for imaging said beam to a spot at the surface of said medium, modulating means located between said light generating means and a scanner device for modulating the light beam in accordance with the information content of electrical signals, means coupled to said modulating means for deflecting said modulated light beam to a predetermined position on said scanner, said scanner device comprising a multi-faceted polygon located in the path of said modulated beam between said beam generating means and said recording medium and having reflective facets for reflecting the beam incident thereon onto said medium, means for rotating said polygon such that the reflected light is scanned in successive traces in any direction across said medium, said system further including an amplitude transmittance spatial filter positioned in the first Fourier plane of said cylindrical lens.

4,884,084

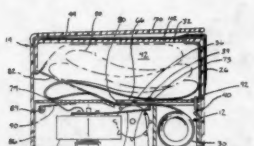
CHART RECORDER

Bart E. Greenhut, Beverly Hills, Calif., assignor to Leon D. Rosen, Los Angeles, Calif.

Filed May 19, 1988, Ser. No. 196,002

Int. Cl.[4] G01D *15/24*

U.S. Cl. 346—136 **18 Claims**



1. In a chart recorder which includes a housing, a strip of paper or other markable material lying in said housing, a marking station in said housing for establishing a mark on said strip, and a transport in said housing for pulling said strip in a downpath direction slowly past said marking station, the improvement wherein:

said strip includes a supply roll with a leader;

said housing includes an opening and a substantially closed storage space lying downpath of said transport for receiving said strip after it has been marked, said storage space being devoid of a roll for rolling up said strip, whereby to allow said strip to be stored in loose folds;

said leader of said strip has an outer end extending through said opening and held to said housing, whereby the stored strip can be removed by pulling it out of said housing through said opening.

4,884,085

RECORDER HAVING RECORD MEDIUM FEED AND PRESS ROLLERS AND LOCKABLE MEANS FOR URGING THE PRESS ROLLERS TO AND FROM THE FEED ROLLER

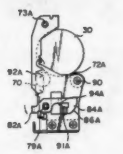
Masakazu Ozawa, Ebina; Kunitaka Ozawa, Isehara; Katsunori Hatanaka, Yokohama; Tetsuo Suzuki, Hiratsuka; Tetsuzo Mori, Hiratsuka; Tadashi Shiina, Hiratsuka, and Ryuichi Ebinuna, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

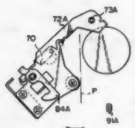
Continuation of Ser. No. 3,050, Jan. 13, 1987, abandoned, which is a division of Ser. No. 733,389, May 13, 1985, Pat. No. 4,651,173. This application Jan. 19, 1989, Ser. No. 300,243

Claims priority, application Japan, May 19, 1984, 59-101508; May 19, 1984, 59-101509; May 19, 1984, 59-101510; May 19, 1984, 59-101511; May 19, 1984, 59-101512

Int. Cl.[4] G01D *15/28;* B41J *3/04*

U.S. Cl. 346—136 **18 Claims**





1. A recorder having a feed roller and a press roller for pinching therebetween a continuous form as a record medium and feeding the continuous form to a record position of recording means as said feed roller is rotated, the recorder comprising:

press roller support means pivotable around a pivot point displaced from said press roller for urging said press roller to said feed roller and from said feed roller;

lock means having a lock member for mechanically locking said press roller support means at a pressing position; and

adjust means for adjusting the pressing position of said press roller to said feed roller by adjustments of said pivot point and the position of said lock member, respectively.

4,884,086

METHOD OF ALIGNMENT OF LED CHIPS

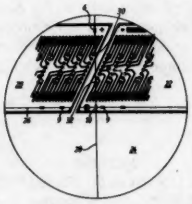
Richard A. Kirk; Peter R. Lee; Peter B. Hart, all of Northampton; George A. A. Chilton, Buckinghamshire, and Alan J. Cobb, Northampton, all of England, assignors to Plessey Overseas Limited, Ilford, England

Filed Sep. 30, 1988, Ser. No. 251,498

Claims priority, application United Kingdom, Sep. 30, 1987, 8722945

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—155 7 Claims



1. A method of alignment of monolithic chips of light emitting diodes to form part of a print head, the method comprising placing microscopically visible alignment marks on each chip in predetermined positions relative to the diode array carried on the chip, positioning two chips adjacent to one another in desired relative positions, and viewing the two chips through a microscope having a graticule, whereby the alignment marks of the two chips are positioned on the cross wires of the graticule whereby the chips are aligned with their respective diode arrays in a correct spacing and orientation relative to one another.

4,884,087

PHOTOGRAPHIC FILM PACKAGE AND METHOD OF MAKING THE SAME

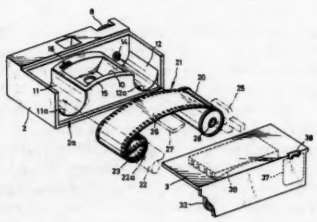
Mitsuyoshi Mochida, Tokyo; Tokuo Maekawa, Kanagawa; Hisashi Takei, Kanagawa; Yasuo Matsumoto, Kanagawa; Hiroshi Ohmura, Tokyo; Shigeru Sugimoto, Kanagawa; Seimei Ushiro, Tokyo; Seiji Asano, Saitama, and Toshio Yoshida, Ibaragi, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 20, 1987, Ser. No. 87,388

Claims priority, application Japan, Aug. 20, 1986, 61-126942[U]; Oct. 17, 1986, 61-246977; Oct. 17, 1986, 61-246978; Jan. 19, 1987, 62-5694[U] Jan. 19, 1987, 62-5698[U]; Feb. 14, 1987, 62-32185

Int. Cl.[4] G03B *1/10, 1/66, 17/02, 17/28*

U.S. Cl. 354—75 15 Claims



1. A lens-fitted photographic film package having an externally operable member for effecting an exposure, comprising:

a light-tight film casing which must be destroyed to open the same, having an opening through which said exposure is made when said externally operable member is operated;

an unexposed rolled film disposed on one side of said opening in said light-tight casing;

a removable light-tight film container having a film winding spool therein disposed on the opposite side of said opening in said light-tight casing from said rolled film, one end of said rolled film being attached to said film winding spool;

means for winding said rolled film into said light-tight film container and around said film winding spool; and

winding control means responsive to operation of said externally operable member for allowing said film winding spool to rotate so as to enable said rolled film to be advanced by only one frame after every exposure; said winding control means including:

a sprocket wheel driven by movement of said rolled film; and

a frame counter driven by said sprocket wheel, said frame counter being provided with indications designating a series of frame numbers and means for disabling said winding control means responsive to said frame counter indicating there remains on said unexposed film no film frame capable of being exposed.

4,884,088

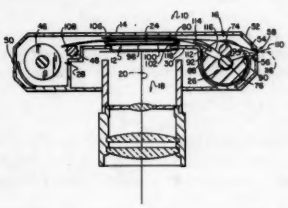
KIT FOR CONVERTING 35 MM CAMERA FOR USE WITH SELF-DEVELOPING TRANSPARENCY FILM

Donald E. Mauchan, Marlboro, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 21, 1988, Ser. No. 274,504

Int. Cl.[4] G03B *17/50*

U.S. Cl. 354—86 6 Claims



1. A kit for converting a conventional 35 mm camera for use with self-developing film, said kit comprising:

a substitute film loading door for replacing the film loading door of the conventional camera, said substitute film loading door having means cooperable with a camera surface for defining an egress through which a self-developing film unit is adapted to be advanced subsequent to its photographic exposure; and

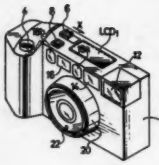
a spread roller assembly, said assembly including a housing having a generally cylindrical configuration approximating that of a conventional 35 mm film cassette and being readily received within a film cassette supply chamber in the camera, a pair of elongate rollers rotatably supported in superposition by said housing so as to define a gap therebetween, and locating means on said housing, said locating means being constructed to be received by a recess in a wall of the film cassette supply chamber for insuring the proper positioning of the spread roller assembly within the film cassette supply chamber.

4,884,089

PSEUDO FORMAT CAMERA

Nobuyuki Taniguchi; Yoshiaki Hata, both of Nishinomiya; Yoshinobu Kudo, Sakai; Manabu Inoue, Kobe; Takeo Hoda, Kawachinagano, and Hiroshi Ueda, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 895,826, Aug. 12, 1986, Pat. No. 4,780,735.
This application Jun. 16, 1988, Ser. No. 207,288
Claims priority, application Japan, Aug. 29, 1985, 60-190520; Aug. 29, 1985, 60-190521; Aug. 29, 1985, 60-190522; Aug. 29, 1985, 60-190523; Aug. 29, 1985, 60-255550; Aug. 29, 1985, 60-286732; Aug. 30, 1985, 60-192621; Sep. 10, 1985, 60-201096; Sep. 10, 1985, 60-201095
Int. Cl.[4] G03B *13/12*
U.S. Cl. 354—222 5 Claims



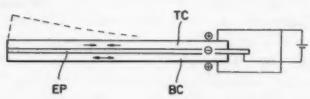
1. A pseudo format camera comprising:
manually operated means;
means for outputting a signal in response to the operation of said manually operated means;
a register whose content is changed in response to the signal outputted by said outputting means;
means for selecting, in accordance with the content of said register, a real focal length photographing mode in which a normal range in a frame of a film will be printed on a photographing paper and a pseudo focal length photographing mode in which a range narrower than the normal range in a frame of the film will be printed on a photographing paper;
first means, responsive to the content of the register, for displaying a mark corresponding to the selected mode on the outer surface of the camera; and
second means, responsive to the content of the register, for displaying in a viewfinder of the camera, a photographing range which will be printed on the photographing paper.

4,884,090

PIEZOELECTRIC ACTUATING DEVICE

Yoshihiro Tanaka; Hiroshi Ootsuka, and Koh Hayama, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 172,599, Mar. 24, 1988, abandoned.
This application Mar. 22, 1989, Ser. No. 327,393
Claims priority, application Japan, Mar. 25, 1987, 62-72751
Int. Cl.[4] G03B *7/08*; H01L *41/08*
U.S. Cl. 354—234.1 3 Claims



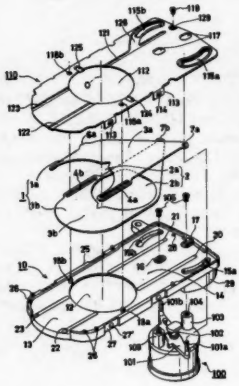
1. A piezo-electric actuating device, comprising:
a piezo-electric element including a first piezo-electric member which is contracted when a first voltage of a first polarity is applied thereacross and which is elongated when a second voltage of a second polarity opposite to the first polarity is applied thereacross, and piezo-electric element further including a second piezo-electric member which is contracted when the second voltage is applied thereacross and which is elongated when the first voltage is applied thereacross, said piezo-electric member being deformed by application of the first and second voltage thereto;
a voltage applying means for alternatively applying the first and second voltages to said piezo-electric element; and
a driven member connected to be actuated by said piezo-electric element upon deformation of said piezo-electric element such that when the first voltage is applied to said piezo-electric element, said driven member is moved in a first direction, and when the second voltage is applied to said piezo-electric element, said driven member is moved in a second direction opposite to the first direction;
said first and second piezo-electric members having a higher yield strength against deformation thereof by application of the first voltage than by application of the second voltage.

4,884,091

EXPOSURE CONTROL DEVICE IN A CAMERA

Kazuhito Nakagomi, Kofu, Japan, assignor to Nippon Seimitsu Kogyo Kabushiki Kaisha, Kofu, Japan

Filed Jul. 19, 1988, Ser. No. 221,288
Claims priority, application Japan, Oct. 8, 1987, 62-154453[U]; Nov. 4, 1987, 62-168845[U]; Nov. 10, 1987, 62-171468[U]; Nov. 10, 1987, 62-171471[U]; Nov. 10, 1987, 62-171472[U]; Nov. 10, 1987, 62-171473[U]; Nov. 10, 1987, 62-171474[U]; Nov. 19, 1987, 62-177034[U]; Nov. 19, 1987, 62-177035[U]; Nov. 30, 1987, 62-183824[U]
Int. Cl.[4] G03B *9/02*
U.S. Cl. 354—271.1 15 Claims



1. An exposure control device in a camera, which comprises an iris composed of a pair of iris diaphragms each having an exposure space, which define an iris aperture and each have a guide slot and a pin hole; a driving motor which is driven in accordance with brightness of a subject to be taken as an image; a rocking lever mounted on said driving motor and provided on its both end portions with driving pins which are in engagement with said pin holes formed in said iris diaphragms; and a base plate having an exposure opening about an optical axis and guide pins slidably fitted one into each guide slot of the iris diaphragms so as to permit the iris diaphragms to move in substantially opposite directions with said rocking lever being, operated by said driving motor, said base plate being provided on its upper surface with guide ribs which come into contact with at least one of said iris diaphragms.

4,884,092
PHOTOGRAPHIC CAMERA

Manabu Inoue, Kobe; Nobuyuki Taniguchi; Yoshiaki Hata, both of Nishinomiya; Takeo Hoda, Kawachinagano; Yoshinobu Kudo, Sakai, and Hiroshi Ueda, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

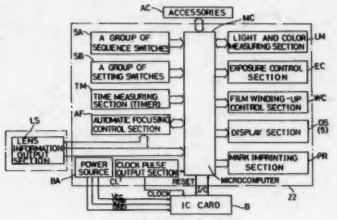
Division of Ser. No. 161,468, Feb. 26, 1988, abandoned, which is a division of Ser. No. 21,659, Mar. 4, 1987, Pat. No. 4,728,978.

This application Oct. 18, 1988, Ser. No. 259,334

Claims priority, application Japan, Mar. 7, 1986, 61-50871; Mar. 7, 1986, 61-50872; Mar. 7, 1986, 61-50873; Mar. 7, 1986, 61-50874; Mar. 10, 1986, 61-52170

Int. Cl.[4] G03B *17/24*

U.S. Cl. 354—289.1 **11 Claims**



1. A photographic camera comprising:

an attaching portion adapted for detachably attaching an information medium including semiconductor memory means capable of reading-out/writing-in, a circuit for communicating data between the semiconductor memory means and the camera to which the medium is loaded and a data exchange terminal for the communication data;

producing means for producing an information which is used during a process of printing a film exposed by the camera and for producing the information at every frame of exposure; and

outputting means for outputting said information from the camera to said medium for making the semiconductor memory means to memorize said information.

4,884,093
APPARATUS FOR THE DEVELOPMENT ESPECIALLY OF A FILM SHEET OF A FILM PUNCHED CARD

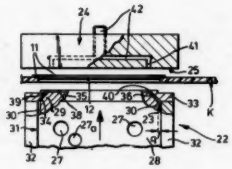
Wolfgang Bohmig, Markgroningen, Fed. Rep. of Germany, assignor to Zeutschel GmbH & Company, Tubingen, Fed. Rep. of Germany

Filed Dec. 21, 1987, Ser. No. 135,974

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1986, 3644050

Int. Cl.[4] G03D *5/00*

U.S. Cl. 354—299 **18 Claims**



1. Apparatus for developing an emulsion coating of a film strip, said apparatus comprising:

a development chamber limited on one side by the emulsion coating, said chamber being subjected to the action of at least one fluid;

said development chamber comprising a gap chamber (37) of substantially rectangular plan and of a height (i) of about 0.1 to 1.0 mm.;

said gap chamber being limited by a first surface (35) of a heated chamber body (28);

said heated chamber body having a height (n);

a carrier surface for positioning the emulsion coating on said film strip, said carrier surface being determined by a rib (39) and a seal edge (40) on a cover frame (33), said seal edge being arranged between said heated chamber body surface and said emulsion coating on said film strip;

said heated chamber body surface being bevelled off on each of two edges crossing a direction of flow (x) of said at least one fluid;

each bevelled edge adjoining a respective side groove extending along a side of said heated chamber body over approximately the entire height (n) of said heated chamber body;

said bevelled edges and said side grooves forming part of a flow-gap ($23,23_e$) of a depth (q) extending over substantially the whole height (n) of said heated chamber body and over a substantial portion of the heated chamber body surface (35);

said flow gap ($23,23_e$) being connected to a fluid inlet (61) and a fluid outlet (83); and

at least one fluid supply (62,96) communicating with said flow gap via said fluid inlet and said fluid outlet.

4,884,094
DATA TRANSMISSION SYSTEM FOR A CAMERA

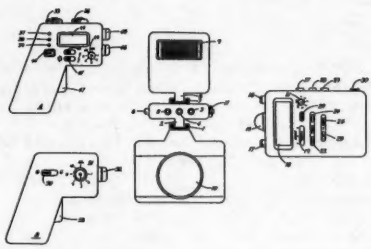
Mashio Kitaura, Tondabayashi; Masaaki Nakai, Kawachinagano; Tadahiro Yoshida, Takatsuki; Yoshiiku Kikukawa, Kishiwada; Takanobu Omaki, Sennan, and Nobuyuki Taniguchi, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 126,606, Nov. 30, 1987, Pat. No. 4,816,855, which is a continuation of Ser. No. 879,110, May 23, 1986, abandoned. This application Jul. 5, 1988, Ser. No. 215,227

Claims priority, application Japan, Sep. 26, 1984, 59-2013813; Feb. 27, 1985, 60-38243; Feb. 28, 1985, 60-39476; Mar. 6, 1985, 60-44361

Int. Cl.[4] G03B *15/05, 7/00, 17/56*

U.S. Cl. 354—412 **9 Claims**



1. A signal transmitter comprising:

a light measurement means, including a light measuring portion, for measuring light from an object;

an exposure time setting means wherein an exposure data is manually set;

a film sensitivity setting means wherein a film sensitivity is manually set;

a calculation means for calculating a diaphragm aperature value in accordance with the values of light measurement, set exposure time and set film sensitivity;

signal outputting means for outputting a measuring mode signal representing that light measured by said light measurement means is either ambient light or flash light;

a data selection means wherein a data for designating a desired operation mode of a camera system operable in a plurality of operation modes is selected; and

a transmitting means, including a light emitter, for serially transmitting, in the form of a light signal, the data output from said exposure time setting means, calculation means, signal outputting means and data selecting means.

4,884,095

APPARATUS FOR WRITING A DATA ONTO PHOTOSENSITIVE FILM

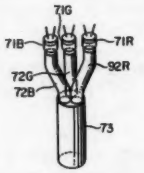
Kenji Yamanouchi, Kokubunji; Yutaka Teraoka, Sagamihara; Makoto Ikeda, Hachioji; Masao Nakamura, Machida, and Satoshi Kawai, Hino, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Continuation of Ser. No. 109,395, Oct. 19, 1987, Pat. No. 4,806,965. This application Feb. 2, 1989, Ser. No. 305,400

Claims priority, application Japan, Oct. 21, 1986, 61-248508; Oct. 23, 1986, 61-250696; Nov. 17, 1986, 61-271720; Nov. 20, 1986, 61-275209; Nov. 21, 1986, 61-276488

Int. Cl.[4] G03B *27/00*

U.S. Cl. 355—1 **3 Claims**



1. An apparatus for optically writing data as a latent image on film coated with a photosensitive material while the film is moving in a predetermined direction, the apparatus comprising:

exposure means comprising a light emitting source including a plurality of multicolor LED's, each of said plural multicolor LED's having a plurality of light emitting elements, each of said light emitting elements capable of emitting a specific color light; and

control means for selecting light emitting elements of said multicolor LED to be illuminted in accordance with the data to be written.

4,884,096

MULTIPLE COLOR IMAGE FORMING APPARATUS

Yasuhiro Kusuda, and Takafumi Tottori, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 13, 1988, Ser. No. 218,155

Claims priority, application Japan, Jul. 15, 1987, 62-176559

Int. Cl.[4] G03G *15/01*

U.S. Cl. 355—233 **14 Claims**

1. A multiple color image forming comprising,

an original table on which an original is placed;

a photosensitive drum which is rotatable;

a scanning means for scanning the original on said original table from the scanning start position to the end position; P1 an image processing means for projecting the original image scanned by said scanning means to said photosensitive drum to form an electrostatic latent image thereon;

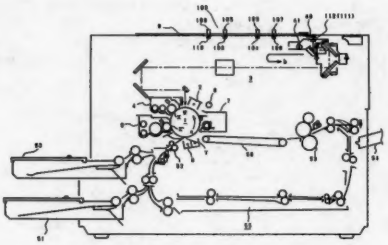
first and second developing means for developing the electrostatic latent image on said photosensitive drum by a toner having different colors respectively;

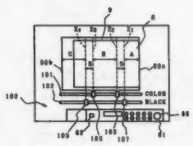
a copying start command input means for inputting the copying start command;

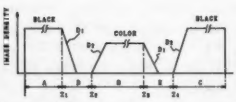
means for starting said scanning means, image processing means and first developing means in response to said copying start command; 'first and second position indicating means for being movable in the scanning direction of said scanning means between said scanning start position and scanning end position along the original table;

a first detecting signal output means for detecting said scanning means arrived at a position responsive to said first position indicating means during the scanning and outputting the first detecting signal;

a first control means for stopping the first developing means in response to said first detecting signal;







a second detecting signal output means for detecting said scanning means arrived at a position responsive to said second position indicating means during said scanning and outputting the second detecting signal; and

a second control means for starting the second developing means in response to said second detecting signal.

4,884,097

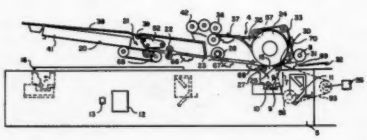
DUPLEX DOCUMENT HANDLER

John Giannetti, Penfield; Robert L. Couture, Scottsville, and Jerry F. Sleve, Henrietta, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 24, 1987, Ser. No. 137,776

Int. Cl.[4] G03B *27/32*

U.S. Cl. 355—23 **9 Claims**



1. A duplex document handler f r selectively moving either one side or each side of each document sheet in a multisheet document past a stationary exposure position, comprising:

supply means for receiving a multisheet document,

means for feeding each document sheet of said document from said supply means along a supply path past said exposure position,

means for feeding said document sheet along a simplex path from said exposure position to a simplex exit means for receiving said sheets stacked in their original order, said simplex exit means being located on the side of said exposure position opposite said supply means,

means for feeding said document sheet along a duplex path, leading edge first, from said exposure position, through an inverting path, into a reversing location generally above said supply path, and then for feeding said document sheet, trailing end first, from said reversing location past said exposure position through said inverting path and said reversing location again, to a duplex exit means for receiving said sheets stacked in their original order, said duplex exit means being located on the same side of said exposure position as said supplymeans, and

means for selecting between said duplex and simplex paths.

4,884,098

IMAGE RECORDING APPARATUS

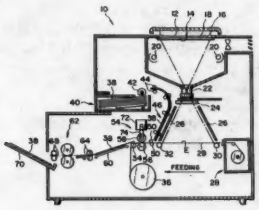
Yumio Matsumoto, Kasugai, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Mar. 25, 1988, Ser. No. 173,051

Claims priority, application Japan, Apr. 1, 1987, 62-50253

Int. Cl.[4] G03B *27/72*

U.S. Cl. 355—27 **5 Claims**



1. An image recording apparatus comprising:

a pair of rollers for passing a photosensitive medium between said rollers while pressing said photosensitive medium to thereby develop a latent image formed on said photosensitive medium by exposure means; and

driving means connected to at least one of said pair of rollers rotating said at least one roller repeatedly alternately in a forward and then a reverse rotation whereby in each cycle the rotational angle during the forward rotation is not smaller than the rotational angle during the reverse rotation of the same roller.

4,884,099

AUTOMATIC ADJUSTMENT OF FOCAL LENGTH TO OBTAIN DESIRED OPTICAL REDUCTION RATIO IN A MICROFILM CAMERA

Ensley E. Townsend, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 10, 1988, Ser. No. 204,795

Int. Cl.[4] G03B *27/52*

U.S. Cl. 355—55 **7 Claims**

1. A microfilm camera having a document transport system, a film drive and a lens assembly adjustable to provide a plurality of different reduction ratios, said camera comprising:

means for driving said document transport system;

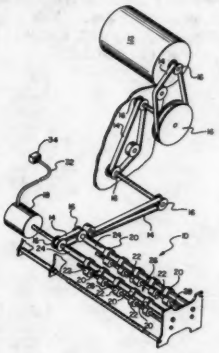
means for monitoring the speed of said document transport system and generating a first signal proportional thereto;

means for driving said film drive;

a drive motor for adjusting said lens assembly;

input means for selecting a desired image reduction ratio; and

control means responsive to said input means for controlling the speed of said film drive in response to said first signal



for electronically synchronizing the speed of said film drive to the speed of said document transport system in accordance with said image reduction ratio, and for adjusting said lens assembly by means of said drive motor in accordance with said input means.

4,884,100

DENSITY MEASURING DEVICE FOR ORIGINALS IN AN ENLARGING/REDUCING PROJECTOR

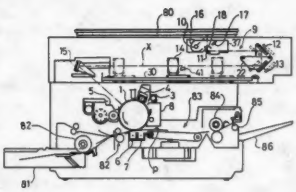
Yamato Kitajima, Ramsey, N.J., and Yuji Hayashi, Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 13, 1988, Ser. No. 193,953

Claims priority, application Japan, May 19, 1987, 62-75694[U]

Int. Cl.[4] G03B *27/74, 27/80*

U.S. Cl. 355—68 **6 Claims**



1. A density measuring device for originals in an enlarging/reducing projector comprising:

a light sensor which detects original density by light from an original via mirrors in order to automatically control image exposure;

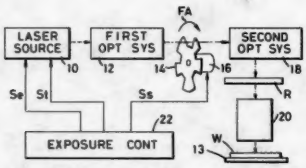
means for correcting an optical path of projection when a projective magnification is changed; and

means for moving the sensor separately from a projection lens when the projective magnification is changed.

4,884,101
APPARATUS CAPABLE OF ADJUSTING THE LIGHT AMOUNT

Akikazu Tanimoto, Yokohama, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Feb. 1, 1988, Ser. No. 151,188
Claims priority, application Japan, Feb. 3, 1987, 62-21677; Feb. 5, 1987, 62-23640; Feb. 5, 1987, 62-23641
Int. Cl.[4] G03B 27/72
U.S. Cl. 355—68 17 Claims



1. An apparatus including:

(a) applying means for applying radiation repetitively to an object;

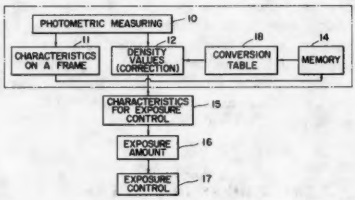
(b) shutter means disposed in the optical path from said applying means to said object, said shutter means having a first state in which said applying means is inhibited from applying the radiation to the object and a second state in which said applying means is permitted to apply the radiation to the object; and

(c) control means for controlling said applying means and said shutter means so that said applying means applies the radiation repetitively to the object during the period from when said shutter means starts the shift from said first state to said second state until said shutter means completes the shift from said second state to said first state, said control means having first calculating means for calculating the amount of radiation applied once by said applying means, prior to the start of the operation of said shutter means by said control means, so that the object obtains a proper exposure amount by the radiation, and second calculating means for calculating the time when said shutter means shifts from said second state to said first state, prior to the start of the operation of said shutter means by said control means, said control means causing said applying means to apply the radiation for a predetermined period on the basis of the amount of radiation calculated by said first calculating means, and wherein said control means controls said shutter means so that the point of time at which said shutter means has substantially completed the shift from said first state to said second state and the point of time at which said shutter means starts the shift from said second state to said first state are substantially coincident with points of time at which said applying means applies the radiation.

4,884,102
CONTROLLING METHOD FOR A PHOTOGRAPHIC SYSTEM

Takaaki Terashita, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 865,024, May 20, 1986, abandoned.
This application May 18, 1989, Ser. No. 355,105
Claims priority, application Japan, May 22, 1985, 60-109767; May 29, 1985, 60-116256; Dec. 19, 1985, 60-284320
Int. Cl.[4] G03B 27/32, 27/80
U.S. Cl. 355—77 8 Claims

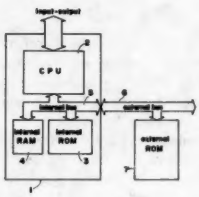


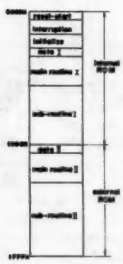
8. A normalization method as claimed in claim 1, wherein said first average values are weighted moving average values obtained by multiplying weight coefficients depending on data numbers from the photometric measuring to current.

4,884,103
PROGRAMMED CONTROL DEVICE FOR COPYING MACHINES AND THE LIKE

Hirokazu Yamada, Toyohashi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 15, 1987, Ser. No. 109,085
Claims priority, application Japan, Oct. 17, 1986, 61-248233
Int. Cl.[4] G03G 15/00
U.S. Cl. 355—200 7 Claims





1. A programmed control device for copying machines comprising:

a control unit including a read only memory storing a main program for general control of the machine and a subprogram for special control of a special portion or function of the machine, and a processing means for processing the control of the machine according to programs;

an external memory capable of connecting to the control unit and storing an identification data and a substitute program which is modified in part from the main program of the read only memory, the substitute program being used as a substantial duplicate of the main program when the external memory is connected to the control unit; and

means operatively connected to the control unit for discriminating the connection of the external memory by confirming the identification data and for overriding the execution of the main program to enable the processing means to control the copying machine by use of the substitute program when the external memory is connected.

4,884,104

IMAGE FORMING APPARATUS HAVING MULTIPLE IMAGE INFORMATION INPUTS

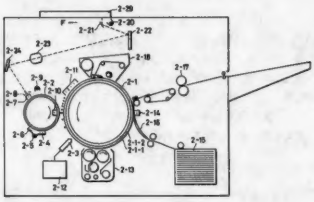
Tadashi Yoshida, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 928,697, Nov. 7, 1986, abandoned, which is a continuation of Ser. No. 849,421, Nov. 7, 1983, abandoned. This application Jun. 29, 1988, Ser. No. 213,452

Claims priority, application Japan, Nov. 10, 1982, 57-196911

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—202 **26 Claims**



1. An image forming apparatus comprising:

means for converting an original image into an electrostatic charge and for maintaining the electrostatic charge;

first forming means for forming a first electrostatic latent image on a recording medium according to the electrostatic charge maintained by said converting means; and

second forming means for forming a second electrostatic latent image on said recording medium according to an input image signal

wherein, in response to a demand for latent image formation by said second forming means during the latent image formation by said first forming means, the function of said first forming means is interrupted and said second forming means is activated, and, the latent image formation by said first forming means, which is performed according to the electrostatic charge maintained by said converting means before the interruption, is started again after the completion of the function of said second forming means.

4,884,105

REPRODUCTION APPARATUS HAVING A SPROCKET-DRIVEN TRANSFER DRUM

Brian J. Joseph, Rochester; Leo G. Procter, Churchville, and Carl W. Roy, Spencerport, all of N.Y., assignors to Eastman Kodak Co., Rochester, N.Y.

Filed Sep. 2, 1988, Ser. No. 239,882

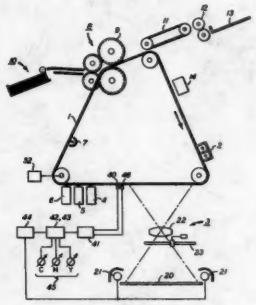
Int. Cl.[4] G03G *15/00, 15/01*

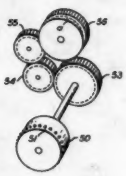
U.S. Cl. 355—212 **9 Claims**

7. A multicolor reproduction apparatus of the type including means for transporting a web carrying electrostatically held toner images of different color through an endless path, which web includes a plurality of closely spaced perforations along an edge thereof, and a transfer device for transferring a plurality of such images in registry to a receiving surface to form a composite image, said transfer device comprising:

a transfer drum including means for holding a receiving sheet on the outer periphery thereof and rotatable to bring a receiving surface of said sheet into transfer relation with said images once for each image to be transferred,

a sprocket having a circumference equal to the pitch of said images on said web and engageable with the perforations in the web and rotatable with the movement of the web, and





gear means between the sprocket and the transfer drum to rotate the transfer drum at a peripheral speed substantially equal to the speed of the web to permit said images to be transferred in registry, said gear means including a sprocket gear coaxial with, driven with and of equal circumference with the sprocket and a drum gear coaxial with, driven with and of equal circumference with the transfer drum and two intermediate gears coupling the sprocket gear and the drum gear, said intermediate gears each being one half the circumference of the sprocket and drum gears.

4,884,106

MULTI-IMAGE REPRODUCTION APPARATUS

Calvin E. Harris, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 2, 1988, Ser. No. 239,885

Int. Cl.[4] G03G *15/01*

U.S. Cl. 355—212 **6 Claims**

5. A color reproduction apparatus comprising:

means for supporting and moving an electrophotosensitive web through an endless path said web having intended image areas and at least one perforation for each image area, each perforation being located in a predetermined position with respect to its respective image area,

means for uniformly charging said web,

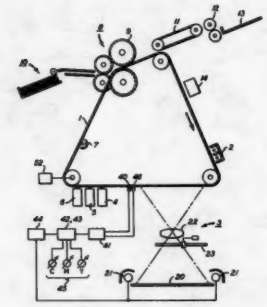
means for exposing said web to a series of color separation light images of an original to create latent electrostatic images thereon representative of said color separation

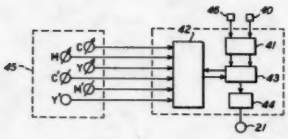
images, each such electrostatic image being located in a separate image area, said exposing means including

flash exposure means for illuminating the original,

means for sensing the arrival of a perforation at a predetermined position along said endless path,

means for actuating said flash exposure means in response to sensing a perforation associated with the image area to be exposed, said actuating means including delay means for delaying the actuation of said flash exposure means by a predetermined time after sensing said perforation, and





means for adjusting said predetermined time for actuation independently for each perforation of said web,

means for developing said images with toners of different color to create visible color images defined by the latent images, and

means for transferring the visible color images in registry to a recieving surface to form a multicolor image, the accuracy of the registration of the color images being dependant upon the accuracy of the relative locations of the exposures with respect to the image areas.

4,884,107

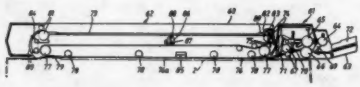
IMAGE FORMING APPARATUS FOR BLANKING PORTIONS OF A DOCUMENT

Junji Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 885,710, Jul. 15, 1986, abandoned. This application Apr. 28, 1989, Ser. No. 344,462

Claims priority, application Japan, Aug. 12, 1985, 60-177201

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—218 **12 Claims**

1. An image forming apparatus having an image carrier, comprising:

first means for receiving a document with a document image surface turned upward;

means for selectively designating an image forming range of said document placed with a document image surface turned upward on said first means, said designating means including a spot light source movable in a two-dimensional plane located along said document for emitting light through said document placed with the document image surface turned upward on said first means so as to define said image forming range;

second means for holding said document with the document image surface turned downward;

mechanical means for automatically transporting said document from said first means to said second means such that said document image surface is turned downward on said second means, and further transporting said document from said second means such that said document image surface is turned upward on said first means; and

means for forming an image, corresponding to said image forming range of the image of said document placed with a document image surface turned downward on said second means, onto said image carrier.

4,884,108

MECHANISM FOR RECIPROCATING AN ORIGINAL TABLE OF A COPYING APPARATUS

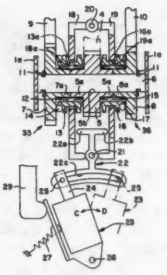
Tamami Nagasawa, Osaka, and Takahiro Fukunaga, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Japan

Filed Nov. 14, 1988, Ser. No. 270,902

Claims priority, application Japan, Nov. 13, 1987, 62-287738

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—234 **7 Claims**



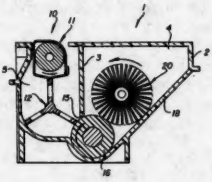
1. In a mechanism for reciprocating an original table of a copying apparatus, comprising a driving means for reciprocating the original table, and two clutch means for transmitting a driving force to a moving means, one of which is used when moving said original table forward and the other of which is used when moving said original table backward, the improvement exists in that said mechanism further comprises: one solenoid which is movably mounted; a change-over means for changing the position of said solenoid from a first position to a second position and vice versa in response to the movement of said original table; and a transfer means for actuating selected one of said clutch means in response to the operation of said solenoid, said selected one corresponding to the position of said solenoid.

4,884,109

DEVICE FOR DEVELOPING ELECTROSTATIC IMAGES

Lawrence A. Hill, Rochester; Michael F. Jacobs, Henrietta; Arthur S. Kroll, Brighton, and Ralph E. Williams, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 6, 1988, Ser. No. 215,682
Int. Cl.[4] G03G *21/00, 15/06*
U.S. Cl. 355—260 2 Claims



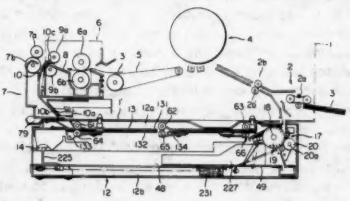
2. A device for developing electrostatic images including a housing defining a chamber for holding a supply of finely divided, dry particulate toner, a feed member located generally at the bottom of the chamber which feed member is rotatable to meter toner out of said chamber into another portion of the device where the toner is used to develop elecrostatic images, said chamber being defined by at least one wall that is slanted to urge toner to said feed member under the force of gravity, characterized by an elongated agitating brush located in said chamber, supported by peripheral engagement with said slanted wall and said feed member and rotatable by such peripheral engagement with said feed member said brush being sufficiently curved, end to end, to periodically impact said slanted wall, as said brush is rotated, to dislodge toner.

4,884,110

SHEET CONVEYANCE APPARATUS

Yasuo Tsurubuchi, and Shogo Kato, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd, Tokyo, Japan

Continuation of Ser. No. 883,146, Jul. 8, 1986, abandoned. This application Aug. 1, 1988, Ser. No. 226,561
Claims priority, application Japan, Jul. 9, 1985, 60-150571; Jul. 9, 1985, 60-150573; Jul. 9, 1985, 60-150575; Jul. 9, 1985, 60-150580
Int. Cl.[4] G03G *21/00;* B65H *5/22*
U.S. Cl. 355—319 22 Claims



1. A sheet conveyance apparatus for copying an image on both sides of a sheet comprising:

an image copy means for copying and fixing image information to a sheet;

a delivery means for delivering the copied sheet;

a first conveying part for feeding the sheet to said image copying means and then conveying the copied sheet to said delivery means;

a path-change means arranged in said first conveying part between said image copy means and said delivery means for changing a conveying direction of the copied sheet according to copy pattern orders, said copy pattern orders consisting of an order to copy one side and both sides;

an intermediate tray for storing the sheet copied on one side, before said sheet is refed through the first conveying part in accordance with a both side copy order;

a second conveying part, capable of effecting reversible rotation therein, for storing operation, said conveying part alternately conveying the sheet copied on one side from said path-change means to said intermediate tray in one direction of rotation and for a refeeding operation that feeds the sheet copied on one side from said intermediate tray to said image copy means by reverse direction of rotation; so that the sheet copied on one side can receive image information on the reverse side thereof and then be conveyed to said delivery means; and

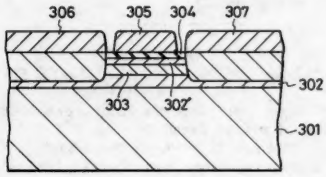
a double feed prevention roller in presence contact with a reversible roller of said second conveying part, thereby causing a rotation of said double feed prevention roller with said reversible rotation of said reversible roller.

4,884,111

SUPERCONDUCTING DEVICE

Toshikazu Nishino, 1618, Kizuki, Nakahara-ku, Kawasaki-shi, Kanagawa; Mutsuko Miyake, 1-25-19, Ohhara, Urawa-shi, Saitama; Ushio Kawabe, 1-8-46, Sakaecho, Hamuramachi, Nishitama-gun, Tokyo; Yutaka Harada, B1-2, 1473, Jousuihoncho, Kodaira-shi, Tokyo; Masaaki Aoki, 4-6-12, Minamiaoyama, Minato-ku, Tokyo, and Mikio Hirano, 1-1-59, Suehirocho, Ome-shi, Tokyo, all of Japan

Continuation of Ser. No. 795,270, Nov. 5, 1985, abandoned. This application Jul. 13, 1987, Ser. No. 73,408
Claims priority, application Japan, Nov. 5, 1984, 59-231308; Feb. 20, 1985, 60-30366; Feb. 25, 1985, 60-34355; Mar. 11, 1985, 60-46539; May 24, 1985, 60-110371
Int. Cl.[4] H01L *39/22, 27/12, 29/78, 23/48*
U.S. Cl. 357—05 4 Claims

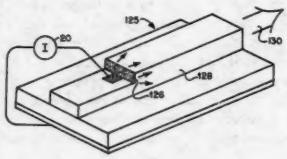


1. A superconducting device comprising: a semiconductor layer; at least two superconducting electrodes formed in contact with said semiconductor layer, said superconducting electrodes being spaced from each other less than 10 times the coherence length of a superconducting electron pair; and at least one control electrode means for controlling current flowing between said superconducting electrodes, said at least one control electrode means being formed on said semiconductor layer between said superconducting electrodes and separated from said semiconductor layer by an electrically insulating film having a thickness of 20 to 80 nanometers, the superconducting electrodes and the control electrode means being positioned on a same side of the semiconductor layer; with an impurity contained in said semiconductor layer being so distributed as to form at least one high impurity concentration region having a concentration above a mean value and at least one low impurity concentration region having a concentration below said mean value, the high impurity concentration region being existent in contact with the superconducting electrodes, wherein the control electrode means is on a low impurity concentration region, with a high impurity concentration region positioned under the low impurity concentration region on which the control electrode means is located.

4,884,112
SILICON LIGHT-EMITTING DIODE WITH INTEGRAL OPTICAL WAVEGUIDE

Joseph P. Lorenzo, Stow, and Richard A. Soref, Newton Centre, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 18, 1988, Ser. No. 170,172
Int. Cl.[4] H01L *33/00*
U.S. Cl. 357—17 **25 Claims**

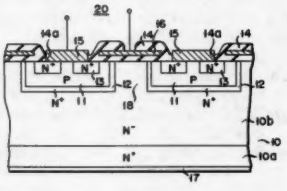


1. An electrooptic silicon device having a longitudinal axis comprising:
- a first doped silicon layer;
- a second doped silicon layer positioned upon said first layer wherein said second silicon layer is formed into an optical waveguide;
- a third doped silicon layer positioned at said optical waveguide wherein said third doped silicon layer forms a p-n junction with said second doped silicon layer;
- a first electric contact electrically coupled to said second silicon layer;
- a second electric contact electrically coupled to said third silicon layer; and
- a power source for forward biasing said p-n junction through said first and second electrical contacts in order to cause said p-n junction to emit light directly into said optical waveguide.

4,884,113
DOUBLE-DIFFUSED, INSULATED-GATE, FIELD EFFECT TRANSISTOR

Ken'ichi Muramoto, Hyogo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 28, 1988, Ser. No. 188,070
Claims priority, application Japan, Dec. 25, 1984, 59-278432
Int. Cl.[4] H01L *29/78, 29/90*
U.S. Cl. 357—23.4 **3 Claims**

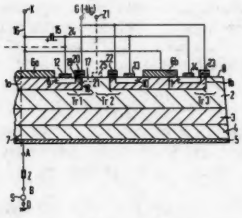


1. A double-diffused insulated-gate field effect transistor comprising:
- a semiconductor substrate of a first conductivity type, the semiconductor substrate forming a drain region;
- two impurity regions of a second conductivity type formed at a predetermined interval, in the semiconductor substrate, said two impurity regions forming a channel base region;
- first high concentration impurity regions of the first conductivity type formed in each of said two impurity regions of the second conductivity type, each said first high concentration impurity region forming a source region;
- a plurality of second high concentration impurity regions of the first conductivity type each formed along an interface between each of said impurity regions of the second conductivity type and the semiconductor substrate to completely surround the channel base region, the concentration of each of the second high concentration impurity regions having a value at which a depletion layer formed at a junction between said second high concentration impurity region of the first conductivity type and said impurity region of the second conductivity type cannot extend beyond the respective second high concentration impurity region into the semiconductor substrate when a source-to-drain voltage is less than 10 volts; and
- an area of the semiconductor substrate formed between said plurality of second high concentration impurity regions.

4,884,114
DISCONNECTABLE THYRISTOR

Eberhard Spenke, Pretzfeld, and Michael Stoisiek, Ottobrunn, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 19, 1983, Ser. No. 515,175
Claims priority, application Fed. Rep. of Germany, Aug. 18, 1982, 3230760
Int. Cl.[4] H01L *29/74*
U.S. Cl. 357—38 **9 Claims**



1. In a thyristor having a triggering means and a semiconductor member having alternating layers of opposite conductivity type consisting in sequence of an emitter of a first conductivity type in contact with an electrode of a first polarity, a base of a second conductivity type, a base of said first conductivity type, with a pn-junction existing between said bases, and an emitter of said second conductivity type in contact with an electrode of a second opposite polarity, at least said emitter of said second conductivity type consisting of a plurality of distinct emitter sections each exhibiting a boundary surface, a means for quenching said thyristor comprising:
- a plurality of switching transistors each consisting of a semiconductor zone of said first conductivity type inserted in one of said emitter sections of said second conductivity type, a partial zone of said base of said first conductivity type, an intermediate channel zone adjacent to said semiconductor zone in said emitter section, said channel zone being covered by an insulating layer at said boundary surface and a gate over said insulating layer, said gate connected to a control terminal; and
- a current source having poles respectively exhibiting said first and second polarities and being interconnected between each of said semiconductor zones and a feed line for said electrode of said second polarity, with a pole of said current source exhibiting said first polarity being connected to said feed line,

whereby said thyristor in a conducting state is rapidly quenched upon the application of a control voltage of said second polarity to said control terminal.

4,884,115

BASIC CELL FOR A GATE ARRAY ARRANGEMENT IN CMOS TECHNOLOGY

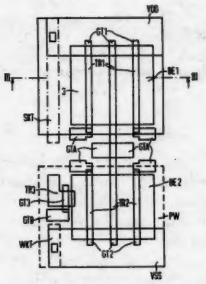
Petra Michel, Grafing, and Martin Geiger, Furth, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich

Filed Feb. 4, 1988, Ser. No. 152,234

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1987, 3706462

Int. Cl.[4] H01L *27/02, 27/10, 27/15*

U.S. Cl. 357—42 12 Claims



1. A basic cell for a gate array arrangement in CMOS technology, including a first region containing a plurality of first transistors of one conductivity type connected in series, and a second region having an identical plurality of second transistors of the opposite conductivity from said one type connected in series, each of said transistors having a gate electrode, a drain electrode, and a source electrode, a plurality of first connecting lines respectively connected to said gate electrodes of said first transistors in said first region and a plurality of second connecting lines respectively connected to said gate electrodes of said second transistors in said second region, said first and second connecting lines being arranged in parallel with each other,

(a) said first and second lines being connected respectively to a plurality of gate electrode contacts located between said first and second regions, said electrode contacts being located at different staggered positions along a direction parallel with said lines, one line of each of said first and second lines being connected in common to a single one of said gate electrode contacts,

(b) a first supply conductor adapted to be connected to a first supply voltage positioned outside said first connecting lines at the outer edge of said first region proceeding in a direction parallel to said first series connected transistors, and

(c) a second supply conductor adapted to be connected to a second supply voltage positioned outside said second connecting lines at the outer edge of said second region proceeding a direction parallel to said second series connected transistors.

4,884,116

DOUBLE DIFFUSED MOSFET WITH POTENTIAL BIASES

Koji Shirai, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 14, 1987, Ser. No. 132,032

Claims priority, application Japan, Dec. 20, 1986, 61-304671

Int. Cl.[4] H01L *27/02*

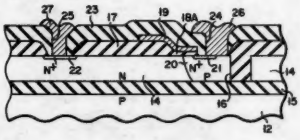
U.S. Cl. 357—41 9 Claims

1. A semiconductor device comprising:

a first semiconductor region of a first conductivity type;

an insulating region formed over the entire surface of said first semiconductor region;

a second semiconductor region of a second conductivity type formed on the entire surface of said insulating region; and



a third semiconductor region of said first conductivity type formed in said second semiconductor region and contacting said insulating region, said third semiconductor region being held at a potential substantially equal to said first semiconductor region.

4,884,117

CIRCUIT CONTAINING INTEGRATED BIPOLAR AND COMPLEMENTARY MOS TRANSISTORS ON A COMMON SUBSTRATE

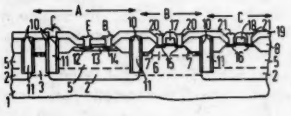
Franz Neppl, Munich, and Josef Winnerl, Landshut, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 60,914, Jun. 12, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 323,218

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1986, 3627509

Int. Cl.[4] H01L *27/02*

U.S. Cl. 357—43 3 Claims



1. An integrated transistor circuit, comprising:

(a) a doped semiconductor substrate;

(b) wells of a conductivity type opposite to that of said substrate formed in said substrate , at least one of said wells containing an MOS transistor, at least one other of said wells containing a bipolar transistor, each well containing a bipolar transistor being the collector of said transistor; and

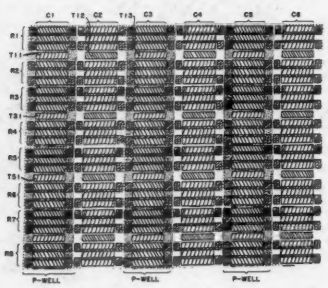
(c) trenches in said substrate surrounding said MOS and bipolar transistors such that each transistor is surrounded in its respective well by said trenches, said trenches having a filler of polycrystalline silicon of the same conductivity type but having a higher doping strength than said wells, said trenches serving to insulate between wells, the filler in the trenches surrounding each bipolar transistor forming a contact terminal for the collector of the bipolar transistor .

4,884,118

DOUBLE METAL HCMOS COMPACTED ARRAY

Alex C. Hui, Palto Alto; Anthony Y. Wong, Cupertino; Conrad J. Dell'Oca, Palto Alto; Daniel Wong, San Jose, and Roger Szeto, San Jose, all of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.

Continuation of Ser. No. 865,071, May 19, 1986, abandoned.
This application Feb. 12, 1988, Ser. No. 158,066
Int. Cl.[4] H01L *29/52, 29/78, 27/10*
U.S. Cl. 357—45 6 Claims



1. An integrated circuit gate array structure comprising:

a semiconductor substrate in which are located columns of semiconductor material of a first conductivity type alternating with and adjacent to columns of semiconductor material of a second conductivity type thereby to leave no intervening area for metal routing, said columns comprising an array of elements, the elements in successive columns of said array being aligned into rows;

active areas formed within said columns to which can be connected conductive material, thereby forming active devices, each of said active areas comprising:

a first source/drain region;

a second source/drain region;

a third source/drain region;

a first channel region between said first and second source/drain regions;

a gate formed above said first channel region to control the conductivity of said first channel region;

a second channel region between said second and third source/drain regions; and

a gate formed above said second channel region to control the conductivity of said second channel region;

tap regions formed within said columns such that tap regions of subsequent columns are aligned into rows, said tap regions having the same conductivity type as the columns in which they are formed and to which can be connected conductive material, said tap regions being more heavily doped than their respective columns thereby to allow current and voltage characteristics of said columns to be controlled;

said active areas and said tap regions in each column being symmetrical about a center line running the length of each of said columns, thus allowing one of said active areas to be paired with another of said active areas in an adjacent column on either side of said one of said active areas;

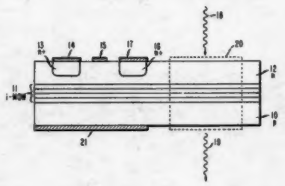
wherein said active areas and said tap regions within one of said columns are placed so as to form a plurality of adjacent cells, each cell consisting of one active area followed by one tap region followed by one active area such that an active area directly abuts an active area in the next adjacent cell.

4,884,119

INTEGRATED MULTIPLE QUANTUM WELL PHOTONIC AND ELECTRONIC DEVICES

David A. B. Miller, Fair Haven, N.J., assignor to American Telephone & Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 22, 1988, Ser. No. 184,747
Int. Cl.[4] H01L *29/12*
U.S. Cl. 357—58 8 Claims



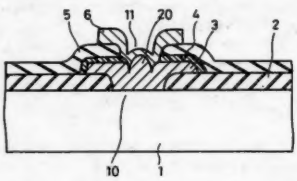
1. An optoelectronic integrated circuit comprising an optical device and an electronic device said optical device including a first doped semiconductor layer, a second doped semiconductor layer, a conductivity type for said first doped semiconductor layer being opposite to the conductivity type for said second doped semiconductor layer, and an intrinsic region interposed between said first and second doped semiconductor layers, and said electronic device including at least first and second doped semiconductor regions confined to said first doped semiconductor layer, said electronic device adjacent to said optical device and said first doped semiconductor layer being electrically continuous over a region substantially including both said electronic device and said optical device.

4,884,120

SEMICONDUCTOR DEVICE AND METHOD FOR MAKING THE SAME

Hiroshi Mochizuki; Reiji Tamaki; Junichi Arima; Masaaki Ikegami; Eisuke Tanaka, and Kenji Saito, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 20, 1987, Ser. No. 16,787
Claims priority, application Japan, Feb. 20, 1986, 61-37785
Int. Cl.[4] H01L *23/48, 29/44, 29/54, 29/62*
U.S. Cl. 357—68 4 Claims



1. A semiconductor device comprising:

a semiconductor substrate;

a first insulating film formed on a surface of said semiconductor substrate and having, in a predetermined region thereof, a first penetrating hole reaching the surface of said semiconductor substrate;

a first interconnection film formed on a predetermined region of said first insulating film and electrically connected to the surface of said semiconductor substrate via said first penetrating hole;

an encapsulation layer, comprising an oxide of said first interconnection film, formed on said first interconnection layer and on said first insulation film, said encapsulation

layer having a void therethrough overlapping said first penetrating hole;

a second insulating film formed on said encapsulation layer and said first insulating film and having in that region which overlaps with said first penetrating hole in planar layout a second penetrating hole reaching the surface of said first interconnection film; and

a second interconnection film formed on a predetermined region of said second insulating film and electrically connected to said first interconnection film via said second penetrating hole, wherein

said first interconnection film has a hillock selectively formed at said first penetrating hole portion and having a predetermined height.

4,884,121

SEMICONDUCTOR DEVICE

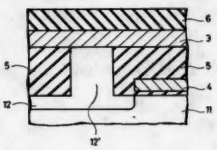
Tatsuya Ishii, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 13, 1987, Ser. No. 49,264

Claims priority, application Japan, May 22, 1986, 61-119518

Int. Cl.[4] H01L *23/54, 23/48*

U.S. Cl. 357—68 **6 Claims**



1. A semiconductor device comprising:

a semiconductor substrate having a major surface, an active region within said substrate and a protruding portion of said active region having a substantially uniform cross section extending above said major surface; and

a conductive interconnection layer formed over said semiconductor substrate;

said interconnection layer having a contact region located above and electrically connected to said protruding portion of said active region for providing an electrical connection to said active region; and

an interlayer insulating layer interposed between said major surface of said semiconductor substrate and said interconnection layer so that the height of said protruding portion is substantially equal to a thickness of said interlayer insulating layer at said protruding portion.

4,884,122

METHOD AND CONFIGURATION FOR TESTING ELECTRONIC CIRCUITS AND INTEGRATED CIRCUIT CHIPS USING A REMOVABLE OVERLAY LAYER

Charles W. Eichelberger, Schenectady; Robert J. Wojnarowski, Ballston Lake, and Kenneth B. Welles, II, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 5, 1988, Ser. No. 230,654

Int. Cl.[4] H01L *23/12, 23/14*

U.S. Cl. 357—71 **12 Claims**

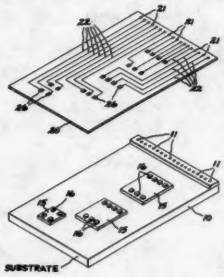
1. An integrated circuit chip package including chips of an electronic system therein, comprising:

a substrate:

a plurality of integrated circuit chips disposed on said substrate, said integrated circuit chips including said chips of said electronic system and when properly interconnected comprising said electronic system and having interconnect pads thereon;

a polymer film overlay layer disposed over said chips and said substrate, said film having apertures therein exposing at least some of said interconnect pads; and

a pattern of metallization disposed on said film and connected to selected interconnect pads through said apertures;



wherein at least one of said chips comprises a test chip operable to test at least one other of said chips for proper operation as connected in said package by the combination of said polymer film overlay and said pattern of metallization.

4,884,123

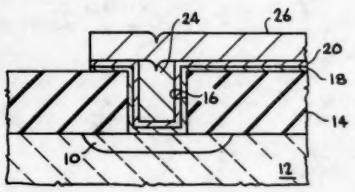
CONTACT PLUG AND INTERCONNECT EMPLOYING A BARRIER LINING AND A BACKFILLED CONDUCTOR MATERIAL

Pankaj Dixit, Sunnyvale; Jack Sliwa, Los Altos Hills; Richard K. Klein; Craig S. Sander, both of Mountain View, and Mohammad Farnaam, Santa Clara, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Feb. 19, 1987, Ser. No. 16,429

Int. Cl.[4] H01L *29/54*

U.S. Cl. 357—71 **18 Claims**



1. A low resistance contact plug, stable in the presence of aluminum, formed in a contact hole less than about μm^2 in area through at least one insulating layer formed on a semiconductor surface to at least a portion of a doped region in said semiconductor surface, said contact comprising:

(a) an adhesion and contacting layer of titaniun about 100–800Å thick formed at least along the walls of said contact hole through said at least one insulating layer and in contact with said portion of said doped region;

(b) a barrier layer formed over said adhesion and contacting layer; and

(c) a conductive material formed over said barrier layer and at least substantially filling said contact hole; and

a patterned interconnect electrically and physically contacting said plug.

4,884,124

RESIN-ENCAPSULATED SEMICONDUCTOR DEVICE

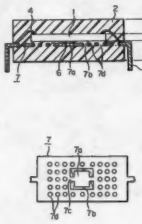
Ryuichiro Mori; Tatsuhiko Akiyama, and Katsuyuki Fukudome, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Aug. 17, 1987, Ser. No. 85,769

Claims priority, application Japan, Aug. 19, 1986, 61-194263; Aug. 19, 1986, 61-194264; Aug. 28, 1986, 61-204216

Int. Cl.[4] H01L *23/28*

U.S. Cl. 357—72 **8 Claims**



1. A packaged semiconductor device comprising:

a semiconductor element having opposed first and second sides;

a flat base having opposed top and bottom sides including a centrally disposed bonding portion on said top side defined by and substantially surrounded by a plurality of elongated recesses in said top side extending only partly through said base toward said bottom side for confining a bonding material to said bonding portion, said bonding portion having a smaller area than said second side and said top side;

a bonding material, disposed on said second side and on said top side confined to said centrally disposed bonding portion, bonding said semiconductor element to said base only at said centrally disposed portion; and

a resin encapsulating said semiconductor element and said base.

4,884,125

HYBRID INTEGRATED CIRCUIT DEVICE CAPABLE OF BEING INSERTED INTO SOCKET

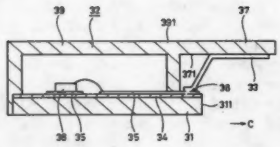
Norio Miura, Gunma, Japan, assignor to Sanyo Electic Co., Ltd., Japan

Filed Oct. 13, 1987, Ser. No. 107,990

Claims priority, application Japan, Oct. 15, 1986, 61-244371; Oct. 17, 1986, 61-247924; Oct. 17, 1986, 61-247925; Oct. 17, 1986, 61-159714; Oct. 17, 1986, 61-159715; Oct. 20, 1986, 61-160393; Nov. 17, 1987, 61-176217

Int. Cl.[4] H01L *23/12, 29/52*

U.S. Cl. 357—74 **13 Claims**



1. A hybrid integrated circuit device comprising:

a metal substrate having an end,

an insulating film formed on said metal substrate,

conductive paths formed on said insulating film and extending to said end of said metal substrate,

a plurality of circuit elements connected to said conductive paths,

conductive pads formed in said end of said metal substrate and connected to said conductive paths,

a casing having a sealing portion formed of an insulating material surrounding said circuit elements, and a connector portion projected from said sealing portion and separated from and extending approximately parallel with said metal substrate, and

external leads having one ends connected to said conductive pads and extending to contact said connector portion of said casing.

4,884,126

SEMICONDUCTOR DEVICE HAVING PARALLEL-CONNECTED, SELF TURN-OFF TYPE SEMICONDUCTOR ELEMENTS

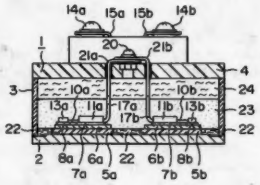
Eiji Harada, Hitachi; Hitoshi Matsuzaki, Mito; Sigeo Tomita, and Katsunori Chida, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 840,203, Mar. 17, 1986, abandoned. This application Jan. 15, 1988, Ser. No. 144,061

Claims priority, application Japan, Mar. 23, 1985, 60-58951

Int. Cl.[4] H01L *23/34, 23/48, 25/02*

U.S. Cl. 357—81 **4 Claims**



1. A semiconductor device having parallel-connected, self turn-off semiconductor elements, comprising:

(a) a package for packaging self turn-off type semiconductor elements, said package including a metallic cooling fin, an insulating side case provided on one principal surface of said cooling fin, and an insulating covering case disposed on said side case;

(b) a plurality of self turn-off type semiconductor elements each having a semiconductor chip having predetermined pn junctions therein and three electrodes in ohmic contact with said semiconductor chip, and mounted on said cooling fin of said package through an insulating material; and

(c) a plurality of terminals mounted on said insulating covering case, each having one end disposed internally of said package and electrically connected with a respective electrode of a corresponding one of said plurality of self turn-off type elements, and the other end exposed externally of said package through said insulating covering case; and

at least one of said plurality of terminals electrically connected with respective ones of said plurality of self turn-off semiconductor elements being mounted on a common terminal mount region of said insulating covering case, and said plurality of self turn-off semiconductor elements being disposed symmetrically with respect to said common terminal mount region.

4,884,127

APPARATUS FOR PRE-CONDITIONING AUXILIARY TELEVISION SIGNAL INFORMATION

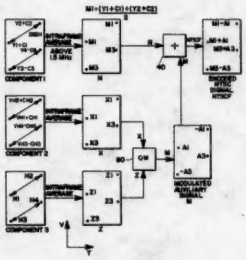
Michael A. Isnardi, Plainsboro, and Robert N. Hurst, Jr., Hopewell, both of N.J., assignors to General Electric Company, Princeton, N.J.

Filed Dec. 29, 1987, Ser. No. 139,338

Claims priority, application United Kingdom, Sep. 14, 1987, 8721565

Int. Cl.[4] H04N *11/14*

U.S. Cl. 358—12 25 Claims



1. A television signal processing system comprising:

means for providing a first signal with mutually exclusive groups of intraframe image pixels of identical value within each group, with grouped pixels exhibiting temporal separation defined by a multiple of a line scanning interval over which a given phase of a chrominance subcarrier recurs;

means for providing a second signal with mutually exclusive groups of intraframe image pixels of identical value within each group, with grouped pixels exhibiting temporal separation defined by a multiple of a line scanning interval over which a given phase of a chrominance subcarrier recurs; and

means for combining said first and second signals via an invertible algorithm to facilitate separating said first and second signals at a receiver.

4,884,128

SIGNAL PROCESSING APPARATUS WITH INDEPENDENT GAIN CONTROL FOR CHROMINANCE AND COLOR SIGNALS

Teruo Hieda, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 325,931

Claims priority, application Japan, Jul. 10, 1985, 60-151791; Jul. 10, 1985, 60-151792; Jul. 10, 1985, 60-151793; Jul. 10, 1985, 60-151794

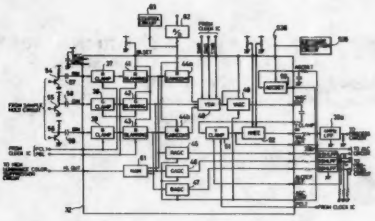
Int. Cl.[4] H04N *9/73*

U.S. Cl. 358—29 31 Claims

1. A signal processing apparatus comprising:

(a) first automatic gain control means for automatically controlling gains of a plurality of color signals;

(b) chroma signal forming means for forming chroma signals using color signals whose gains are automatically controlled by said first automatic gain control means;



(c) high-band luminance signal forming means for dot sequencing said plurality of color signals whose gains are not controlled by said first automatic gain control means.

4,884,129

SIGNAL PROCESSING APPARATUS FOR USE WITH A SINGLE CHIP SOLID-STATE COLOR CAMERA

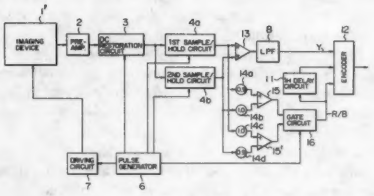
Naoki Ozawa, Akishima; Toshiyuki Akiyama, Tokorozawa; Kenji Takahashi, Kanagawa; Itaru Mimura, Hachioji, and Takahiro Nakano, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 22, 1988, Ser. No. 171,714

Claims priority, application Japan, Mar. 23, 1987, 62-65698

Int. Cl.[4] H04N *9/077, 9/04, 9/64*

U.S. Cl. 358—44 11 Claims



1. A signal processing apparatus for use with an imaging device having an image signal output means inherently generating noise in operation so that noise may be superposed on the image signal, said image signal from said output means including pixel signal pieces representative of at least two kinds of color components of an image alternately recurrent one after another with a predetermined period with said noise being superposed on the pixel signal piece in each period, the apparatus comprising:

means connected with said image signal output means for disabling the noise superposed on the pixel signal piece at least during a part of said each period;

means connected with said disabling means for sampling and holding an output of said disabling means, using at least two sampling pulses mutually phase-shifted by an amount substantially identical with said period, to extract a noise-disabled part of the output of said disabling means and, at the same time, to separate the extracted signal for generating at least two noise-suppressed pixel signals for demodulation of chroma signals corresponding to said at least two kinds of color components of an image during line periods of the image signal;

means connected with said sampling and holding means for producing a sum of said noise-suppressed pixel signals to generate a luminance signal; and

means connected with said sampling and holding means for

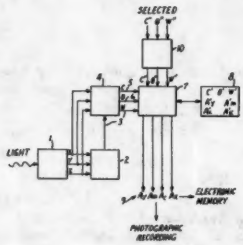
producing a difference between said noise-suppressed pixel signals to generate chroma signals each for every other line period.

4,884,130

METHOD OF DESCRIBING A COLOR IN A TRIAXIAL PLANAR VECTOR COLOR SPACE

James R. Huntsman, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 29, 1988, Ser. No. 187,831
Int. Cl.[4] G03F *3/08*; H04N *1/16*
U.S. Cl. 358—80 **18 Claims**



1. A method of representing a color according to the vector space geometry in a triaxial, essentially planar vector color space comprising the steps of:

(a) illuminating a surface with light, said light having a spectral composition and intensity generally throughout the visible region of the electromagnetic spectrum, and receiving said light or receiving light intensity from a self-luminous object,

(b) converting the received intensity of said light from said surface or said object into electronic data representing at least three visual responses either optically with filters or electronically with a mathematical transformation related to wavelength, intensity, and perception,

(c) selecting the lowest value of said electronic data as achromatic data and converting said electronic data into chromatic data by letting each value of said electronic data be an ordinate value on a corresponding axis of a triaxial, essentially planar vector space and determining chroma as the magnitude and hue as the direction of the vector resulting from said vector space geometry of the ordinate values of said electronic data,

(d) determining the amounts of primary colors capable of representing said color by comparing said converted achromatic and chromatic data to similarly converted achromatic and chromatic data from known colors having known corresponding density, intensity, or area amounts relative to a pixel element in terms of said primary colors, and

(e) storing, transmitting, or outputting said chromatic and achromatic data, or said amounts of primary colors.

4,884,131

STEREOSCOPIC TELEVISION SYSTEM WITH PREDICTIVE CODING TO MINIMIZE DATA BANDWIDTH

Dan S. Chevion, Haifa; Ehud D. Karnin, and Eugeniusz Walach, both of Kiryat Motzkin, all of Israel, assignors to International Business Machines Corp., Armonk, N.Y.

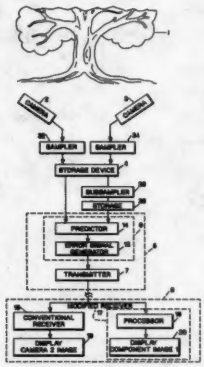
Filed Aug. 15, 1988, Ser. No. 231,934
Claims priority, application Israel, Sep. 2, 1987, 83752
Int. Cl.[4] H04N *13/00*
U.S. Cl. 358—88 **17 Claims**

1. A method for transmitting at a transmitter site and receiving at a receiver site 3-dimensional video images of a scene using conventional video transmission channels, comprising:

producing at least two images by imaging said scene from different viewing angles,

sampling said images so as to generate sets of component picture elements respectively associated with each image,

storing all said sets of component picture elements and sub-sampling said sets of component picture elements in accordance with a predetermined pattern in order to form first and second sets of signals for each set of component picture elements,



storing all said sets of signals,

transmitting both sets of signals of a first of said images,

predicting a second set of signals of a second of said images at both the transmitter and receiver sites,

generating at the transmitter site a compressed set of signals derived from said sub-sampled second set of signals of said second image and said corresponding predicted set,

transmitting said compressed set of signals, and

receiving and processing at said receiver site all the transmitted signals so as to regenerate said second set of signals.

4,884,132

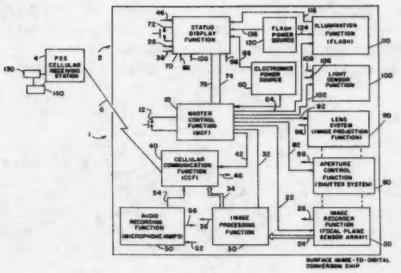
PERSONAL SECURITY SYSTEM

James A. Morris, P.O. Box 4002, Charlottesville, Va. 22903; Terry F. Morris, 1405 Chandler Rd., Huntsville, Ala. 35801, and Frank O. Birdsall, Rte. 1, Box 16, Afton, Va. 22920

Continuation of Ser. No. 934,836, Nov. 25, 1986, abandoned. This application Dec. 28, 1988, Ser. No. 291,342
Int. Cl.[4] H04N *7/18*
U.S. Cl. 358—93 **15 Claims**

1. A personal security system comprising a hand-held unit having a digital image sensor, wherein the image sensor comprises a surface image to digital signal conversion chip, a cellular transmitter for transmitting a digital image, a window,

wherein the window is optically aligned with the sensor for permitting an image to pass through the window to the sensor,



and digital preprogrammed information identifying the hand-held unit to a remote location.

4,884,133

ENDOSCOPE LIGHT SOURCE APPARATUS

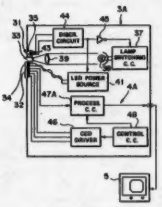
Masahide Kanno; Hisao Yabe; Takeshi Yokoi, all of Hachioji; Jun Yoshinaga, Hino, and Kazuhiko Ohzeki, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1988, Ser. No. 204,312

Claims priority, application Japan, Jun. 11, 1987, 62-145526

Int. Cl.[4] A61B *1/04, 1/06*

U.S. Cl. 358—98 **7 Claims**



1. An endoscope apparatus comprising:

a first endoscope having a light guide means which can transmit an illuminating light and can radiate said illuminating light onto an object and an observing means wherein an image of said object illuminated by said light guide means can be observed;

a second endoscope having a light source which can emit a light of a single wavelength band and can radiate said light onto an object and an observing means wherein an image of said object can be observed;

a light source apparatus having a light guide light source which can feed an illuminating light to said light guide means and a power source which can feed an electric power to said light source provided in said second endoscope and capable of being selectively connected with said first endoscope and said second endoscope.

4,884,134

VIDEO ENDOSCOPE APPARATUS EMPLOYING DEVICE SHUTTER

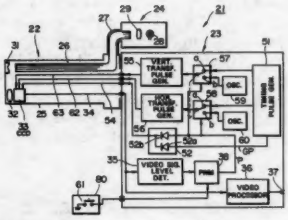
Kiyoshi Tsuji, Tana; Kenji Kimura, Tachikawa, and Yoshihiro Okada, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 30, 1988, Ser. No. 238,061

Claims priority, application Japan, Oct. 7, 1987, 62-254068; Apr. 19, 1988, 63-97417

Int. Cl.[4] A61B *5/04, 1/06*

U.S. Cl. 358—98 **32 Claims**



1. A video endoscope apparatus comprising:

(a) an electronic scope including:

an elongated inserting section;

light emitting means for emitting illuminating light through the leading end of said inserting section;

an objective optical system disposed at said leading end of said inserting section for focusing an optical image; and

imaging means including a solid state imaging device for effecting photoelectric conversion of said optical image focused by said objective optical system; and

(b) charge-storage-time shortening means for shortening the storage time required for signals obtained by said photoelectric conversion of said solid state imaging device to be stored in the form of signal charges.

4,884,135

APPARATUS FOR PROMOTING THE VIGILANCE OF A MOTOR VEHICLE OPERATOR

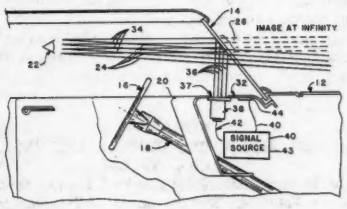
Julius Schiffman, 12960 LaSalle La., Huntington Woods, Mich. 48070

Division of Ser. No. 15,160, Feb. 17, 1987, Pat. No. 4,742,389, which is a continuation of Ser. No. 710,676, Mar. 12, 1985, abandoned. This application Apr. 29, 1988, Ser. No. 187,834

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[4] H04N *7/18*

U.S. Cl. 358—103 **11 Claims**



1. An apparatus for use in a ground vehicle having a windshield through which a driver may view conditions in the direction of travel of the ground vehicle, the apparatus comprising:

a signal source for generating a video signal comprising a series of moving visual images constituting a visual program of unpredictable, new information unrelated to the operation of the ground vehicle; and

a visual display means connected to said signal source for presenting a visual display of said video signal, the visual display means including

a video display source connected to said signal source for emitting light corresponding to said video signal, and

a reflecting device having an area, which is a small fraction of the total windshield area and disposed on the windshield in a position slightly above the line of sight of the driver toward the direction of travel of the ground vehicle for reflecting the light emitted by said video display source to the driver,

whereby the driver can observe said visual display while operating the ground vehicle and such observation will maintain the field of view of the driver in the proper position for operation of the ground vehicle and will maintain the driver in a mental state of vigilance.

4,884,136

MOTION DETECTION CIRCUIT

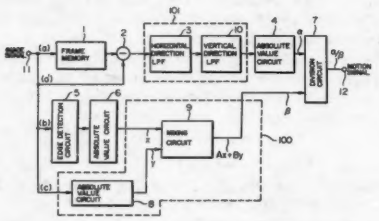
Yuichi Ninomiya; Yoshimichi Ohtsuka, both of Kawasaki; Yoshinori Izumi, Tokyo; Seiichi Gohshi, Komae, and Yoshiaki Shishikui, Yokohama, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

Filed Sep. 28, 1988, Ser. No. 250,160

Claims priority, application Japan, Oct. 2, 1987, 62-247790

Int. Cl.[4] H04N *5/91*

U.S. Cl. 358—105 **7 Claims**



1. A motion detection circuit comprising:

means for producing a interframe difference signal of a sub-sampled image signal;

filter means for removing, from the interframe difference signal outputted from the producing means, its aliased portion;

detection means for detecting an edge of the image signal;

mixing means for mixing an absolute value of a level of the image signal and an absolute value of an output signal from the detection means; and

dividing means for dividing an absolute value of an output signal from the filter means by an output signal from the mixing means to provide a motion signal.

4,884,137

HEAD MOUNTED VIDEO DISPLAY AND REMOTE CAMERA SYSTEM

Charles M. Hanson, Richardson; Vaughn J. Koester, Dallas, and Robert D. Fallstrom, Richardson, all of Tex., assignors to Varo, Inc., Garland, Tex.

Division of Ser. No. 883,994, Jul. 10, 1986, Pat. No. 4,786,966. This application Mar. 14, 1988, Ser. No. 168,137

Int. Cl.[4] H04N *7/18, 5/33, 7/22;* H04B *9/00*

U.S. Cl. 358—108 **9 Claims**

1. A video system, comprising:

an imaging system for generating video signals representative of an object;

a video receiver and display remotely located from said imaging system;

an optical link operating between a short UV and a far IR wavelength for transmitting said video signals between said imaging system and said video receiver;

means for presenting to the person different images superimposed one on another so that plural images can be viewed simultaneously, said presenting means comprising a partially reflecting mirror disposed in the paths of two images; and

means removably attachable to a person's head, including means for mounting thereto said video display in a position such that the person can view the display without the use of the person's hands and wherein the person can move about in an unimpeded manner.

4,884,138

VIDEO TRANSMISSION SYSTEMS

Richard Storey, Newchapel, United Kingdom, assignor to British Broadcasting Corporation, London, England

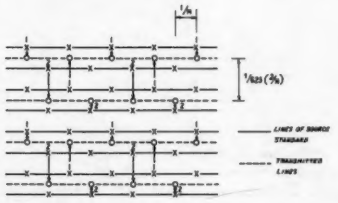
PCT No. PCT/GB86/00797, § 371 Date Apr. 4, 1988, § 102(e) Date Apr. 4, 1988, PCT Pub. No. WO88/01462, PCT Pub. Date Feb. 25, 1988

PCT Filed Dec. 23, 1986, Ser. No. 174,792

Claims priority, application United Kingdom, Aug. 19, 1986, 8620110

Int. Cl.[4] H04N *7/01, 7/12*

U.S. Cl. 358—133 **13 Claims**

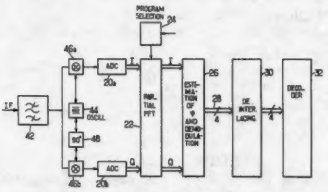


1. A method of transmitting a video signal originating at a relatively higher line standard over a transmission channel for signals at a lower line standard, comprising reducing the bandwidth of the higher line standard signal to one quarter of that of the higher line standard signal, collapsing two lines of the bandwidth reduced signal into a single line of the lower standard and transmitting samples at substantially a quarter of the bandwidth of the higher line standard, the samples being so formed as not to prejudice the ability of the bandwidth reduction decoding process to resolve the full resolution of the original higher line standard signal.

4,884,139
METHOD OF DIGITAL SOUND BROADCASTING IN TELEVISION CHANNELS WITH SPECTRUM INTERLACING

Daniel Pommier, Mordelles, France, assignor to Etat Francais, Represente Par Le Secretariat D'etat Aux Post Es Et Telecommunications (Centre National D'etudes Des Telecommunications), France

Filed Dec. 23, 1987, Ser. No. 137,369
Claims priority, application France, Dec. 24, 1986, 86 18163
Int. Cl.[4] H04N *7/08*
U.S. Cl. 358—142 **8 Claims**

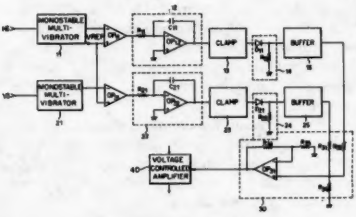


1. Process for broadcasting of digital signals in a television channel subjected to interference with a television program broadcast in an adjacent channel in the form of a signal having a spectrum of a plurality of spectral lines separated by low spectral power density intervals, comprising distributing said digital signals between a plurality of frequencies interlaced with the spectral lines of the signal of the television program for transmission, whereby frequency multiplexing is achieved and extracting said digital signals by comb filtering on reception.

4,884,140
VIGNETTING COMPENSATING CIRCUIT FOR A VIDEO CAMERA

Jong B. Park, Seoul, Rep. of Korea, assignor to Goldstar Co., Ltd., Seoul, Rep. of Korea

Filed Nov. 2, 1988, Ser. No. 266,099
Claims priority, application Rep. of Korea, Nov. 18, 1987, 19978/1987
Int. Cl.[4] H04N *5/208, 5/14, 5/235, 5/335*
U.S. Cl. 358—168 **4 Claims**



1. A vignetting compensating circuit for a video camera comprising:

monostable multivibrators (11), (21) for outputting pulse signals corresponding to a width of one-half-cycle of a horizontal synchronizing signal (HS) and of a vertical synchronizing signal (VS);

operational amplifiers (OP_{11}), (OP_{21}) for amplifying the output signals of said monostable multivibrators (11), (21);

integrators (12), (22) for integrating the output signals of said operational amplifiers (OP_{11}), (OP_{21});

clamp circuits (13), (23) for clamping the minimum value of the output signals of said integrators (12), (22) to zero volt;

wave form shaping circuits (14), (24) for shaping the output signals of said clamp circuits (13), (23) into parabolic waves;

buffers (15), (25) for buffering and amplifying the output signals of said wave form shaping circuits (14), (24);

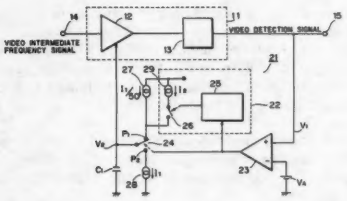
an adder (30) for adding the output signals of said buffers (15), (25) one to another; and

a voltage controlled amplifier (40) for amplifying the video signal taken by a video camera in proportion to the output voltage of said adder (30).

4,884,141
AUTOMATIC GAIN CONTROL CIRCUIT

Junichi Hyakutake, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 24, 1989, Ser. No. 300,977
Claims priority, application Japan, Jul. 27, 1988, 63-188818
Int. Cl.[4] H04N *5/52, 9/64*
U.S. Cl. 358—174 **6 Claims**



1. An automatic gain control circuit, comprising:

an input means for inputting a video intermediate frequency signal;

a video intermediate frequency signal processing circuit connected to said input means, for amplifying and detecting said video intermediate frequency signal to output a video detection signal;

a decision circuit connected to said video intermediate frequency signal processing circuit, for deciding whether a peak of an amplitude of said video detection signal reaches a predetermined reference value or not to output a first output when reaches and a second output when does not reach;

a gain control circuit connected to said decision circuit and said video intermediate frequency signal processing circuit, for decreasing a gain of said video intermediate frequency signal processing circuit at a relatively fast first speed in response to said first output and increasing the gain of said video intermediate frequency signal processing circuit at a relatively slow second speed in response to said second output; and

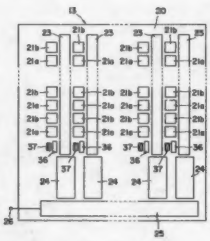
a gain variation speed changing circuit connected to said decision circuit and said gain control circuit, for changing said second speed in said gain control circuit into a third speed faster than said second speed when said first output is not outputted from said decision circuit for a predetermined period longer than one horizontal period.

4,884,142

ELECTRONIC CAMERA HAVING SOLID STATE IMAGE SENSOR WITH IMPROVED NOISE SIGNAL DRAINING

Nobuo Suzuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 27, 1987, Ser. No. 113,063
Claims priority, application Japan, Oct. 28, 1986, 61-256361
Int. Cl.[4] H04N *3/14*
U.S. Cl. 358—213.19 **15 Claims**



1. A process for forming an optical image in a solid state image sensor comprising the steps of:

(a) registering an image on photosensitive units containing pixels;

(b) generating charges corresponding to the received image;

(c) transferring from the photosensitive units any unnecessary charges generated in the photosensitive pixels therein;

(d) accumulating any said charges generating in step (b);

(e) draining any unnecessary transferred charges;

(f) removing from the image sensor any signals accumulated in the accumulation unit just before exposure began; and

(g) at the end of the exposure time, draining charges accumulated during the exposure time by the process of steps (a) to (f);

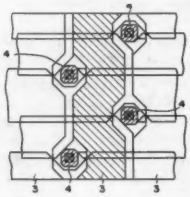
wherein unnecessary charges generated in the photosensitive pixels are drained just before the beginning of the exposure period and just after the end of the exposure period.

4,884,143

LAMINATION TYPE SOLID IMAGE PICK UP APPARATUS FOR AVOIDING A NARROW CHANNEL EFFECT

Shinji Uya, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 26, 1988, Ser. No. 248,975
Claims priority, application Japan, Sep. 29, 1987, 62-245404
Int. Cl.[4] H04N *3/14*
U.S. Cl. 358—213.28 **3 Claims**



1. A solid state image pick up apparatus comprising:

a semiconductor substrate;

a plurality of channels arranged at predetermined intervals in an upper region of said semiconductor substrate, each channel being formed in a zigzag pattern with a nearly constant channel width;

transfer electrodes formed through gate insulation films on said channels, respectively;

source layer sfor individual pixels, disposed adjacent to said channels, respectively, for supplying signal charges of individual pixels to respective channels in said upper region of said semiconductor substrate, said source layers being formed in such a pattern that those source layers which are horizontally adjacent to one another are shited from said channel in a vertical direction by a ½ pixel pitch;

first electrode means arranged on said insulating layer, parts of said first electrode means being in contact with said source layers, respectively;

a photoconductive film disposed on said first electrode means; and

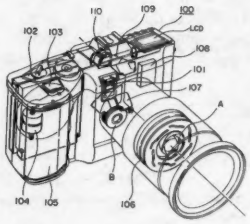
second electrode means laminated on said photoconductive film.

4,884,144

ELECTRONIC CAMERA

Shigeru Jinnai, and Shinji Sakai, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 51,667, May 18, 1987, abandoned. This application Apr. 12, 1989, Ser. No. 338,364
Claims priority, application Japan, May 21, 1986, 61-116375
Int. Cl.[4] H04N *5/238*
U.S. Cl. 358—228 **16 Claims**



1. An electronic camera comprising:

(a) detecting means for detecting the brightness of an object to be photographed;

(b) image pickup means for receiving an optical image from the object to produce an image signal;

(c) an exposure control member for controlling the amount of the light incident on said image pickup means within a predetermined range;

(d) sensitivity control means for controlling variation of the amplification of said image signal of said image pickup means; and

(e) main control means for controlling said exposure control member in accordance with the detection information of said detecting means and further controlling said sensitivity control means in said range of possible exposure control by said exposure control member.

4,884,145

ALIGNMENT OF DOUBLE ECCENTRIC AIMING SYSTEM FOR SOLID STATE CAMERA

Seymour Kaye, Flushing, and William R. Thompson, Malverne, both of N.Y., assignors to Loral Corporation, Syosset, N.Y.

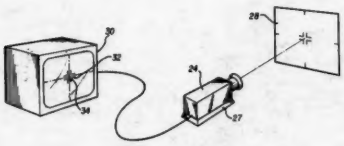
Filed Dec. 31, 1986, Ser. No. 948,258
Int. Cl.[4] H04N *9/097*; G02B *7/02*
U.S. Cl. 358—229 **7 Claims**

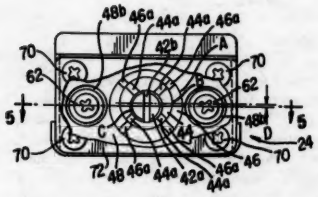
1. An apparatus for aligning an image-forming optical element with respect to an object to be imaged, comprising:

(a) a housing comprising alignment means for permitting

adjustment of the relative positions of an element mounting member and said housing, said alignment means comprising inner and outer eccentric adjustment members, each of said adjustment members comprising an outer cylindrical surface and a bore, the axes of said cylindrical surfaces and bores of said adjustment members being parallel to but not coaxial to one another, said element mounting member having a cylindrical surface fitting within said bore of said inner eccentric adjustment member, and said housing comprising a cylindrical bore for receiving said outer eccentric adjustment member,

(b) means for fixably mounting said image forming optical element to said element mounting member,





(c) means for mounting said housing on an alignment mount in predetermined relation to an optical target,

(d) means for operating said image-forming optical element to display an image of said optical target,

(e) means for adjusting the position of said optical element with respect to said housing and said alignment mount by varying the relative angular positions of said inner and outer eccentric adjustment member relative to the housing until said image of said optical target indicates that said element is properly aligned,

(f) means for locking said optical element with respect to said housing; and

(g) means for mounting said housing on a second mount in predetermined relation to said object to be imaged.

4,884,146

IMAGE DISPLAY SYSTEM

Kenroh Yatsunami, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 14, 1988, Ser. No. 218,991

Claims priority, application Japan, Jul. 14, 1987, 62-175201; Jul. 14, 1987, 62-175202; Jul. 14, 1987, 62-175203; Jul. 14, 1987, 62-175204; Jul. 14, 1987, 62-175205

Int. Cl.[4] H04M *1/00*

U.S. Cl. 358—400 **20 Claims**

1. An image display system having a display board, comprising:

information reading means for reading information;

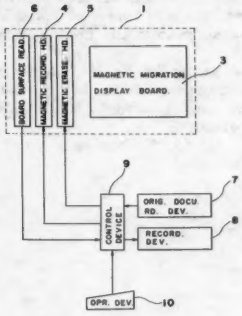
information display means for displaying said information read by said information reading means; and

copying means for producing an output representing said information being displayed on said information display means;

said information display means including,

information writing means for writing information onto the display board, and

information erasing means for erasing information from the display board,



said information erasing means preceding said information writing means with respect to a direction for writing said information onto the display board.

4,884,147

IMAGE SIGNAL PROCESSING SYSTEM

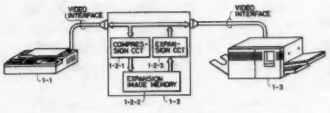
Shinobu Arimoto, Tokyo, and Masanori Muramatsu, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 246,947, Sep. 20, 1988, abandoned, which is a continuation of Ser. No. 823,243, Jan. 28, 1986, abandoned. This application Mar. 6, 1989, Ser. No. 319,921

Claims priority, application Japan, Jan. 31, 1985, 60-17002; Jan. 31, 1985, 60-17005; Jan. 31, 1985, 60-17010

Int. Cl.[4] H04H *1/40*

U.S. Cl. 358—443 **30 Claims**



1. An image signal processing system comprising:

input means for entering image signals;

compression means for compressing the image signals entered by said input means;

memory means for storing the image signals of plural images, compressed by said compression means; and

control means for controlling the storage of the image signals into said memory means;

wherein, in case said memory means comprises plural areas available for memory, said control means is adapted to select a memory area according to a memory capacity of each area.

4,884,148

CIRCUIT EMPLOYING A PLURALITY OF COUNTERS AND AN INTERPOLATOR FOR CONVERTING A VIDEO SIGNAL INTO A BINARY SIGNAL

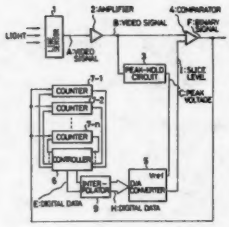
Osamu Ishikawa; Mikihiko Sone, and Yoshimi Suzuki, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 116,863, Nov. 4, 1987. This application Oct. 31, 1988, Ser. No. 264,710

Claims priority, application Japan, Nov. 14, 1986, 61-269788; Nov. 14, 1986, 61-269789

Int. Cl.[4] H04N *1/40, 5/228*

U.S. Cl. 358—464 4 Claims



1. A circuit for converting a video signal comprising a series of pixel signals into a binary video signal comprising a series of corresponding binary signals, said pixel signals being obtained by photelectrically reading an object having an effective area in which information to be read is present and a marginal area outside the effective area, comprising:

a line image sensor comprising a plurality of sensor elements for photoelectrically reading the object line by line to produce pixel signals indicative of brightness levels of pixels forming each line of the object, each pixel signal being produced by a corresponding one of the sensor elements;

means responsive to the pixel signals produced by the line image sensor for setting respective reference levels for sections into which said line image sensor is divided, each section consisting of a plurality of adjacent ones of the sensor elements, said reference level setting means including

means for producing digital reference level data for each of said sections from the pixel signals produced by the line image sensor,

an interpolator for producing interpolated digital reference level data for each of a plurality of subsections into which said sections are divided from the digital reference level data, and

a D/A converter for converting said interpolated digital reference level data into corresponding analog reference level signals; and

a comparator for comparing each pixel signal with the analog reference level signal for the subsection to which the sensor element which produced the pixel signal belongs to produce the corresponding binary signal.

4,884,149

IMAGE RECORDING WITH DATA TRANSMISSION BYPASS AND SHIFT REGISTER

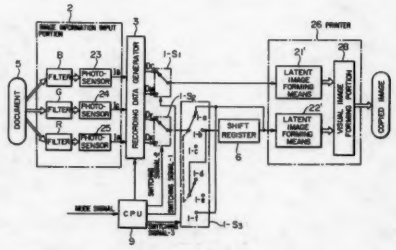
Hisashi Shoji; Satoshi Haneda, and Kunihisa Yoshino, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Mar. 22, 1988, Ser. No. 171,836

Claims priority, application Japan, Mar. 26, 1987, 62-72810; Mar. 30, 1987, 62-76978; Mar. 30, 1987, 62-76979; Apr. 9, 1987, 62-88138; Apr. 9, 1987, 62-88139; Jun. 22, 1987, 62-156335

Int. Cl.[4] G01D *9/42;* H04N *1/23*

U.S. Cl. 358—300 7 Claims



1. An image forming apparatus comprising

a data introducing means for introducing an image data to be recorded,

an image carrying means for producing an image thereon,

a writing means for writing the image onto said image carrying means in accordance with the image data,

a transmission means for transmitting the image data from said introducing means to said writing means,

said transmission means having

a shift register for sequentially shifing the image data therethrough so that image data is transferred to the writing means with a predetermined time delay,

a bypass line for bypassing said shift-register so that said image data is transferred directly to the writing means without said predetermined time delay,

a circulation line for circulating the image data from an outlet to an inlet of said shift register, and

a switch means for establishing a transmission mode of said trransmission means by selectively connecting said shift register, said bypass line and said circulation line.

4,884,150

INFORMATION REPRODUCER

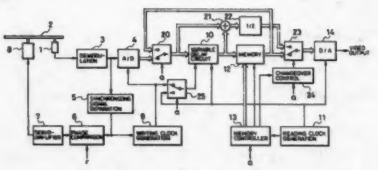
Masao Kanda, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jan. 20, 1988, Ser. No. 145,956

Claims priority, application Japan, Jan. 20, 1987, 62-10941

Int. Cl.[4] H04N *9/87*

U.S. Cl. 358—327 11 Claims



1. An information reproducer of the type in which video information recorded on a recording medium is read therefrom and reproduced, comprising; first timing signal generation

means for generating a first timing signal corresponding to the time-axis error of a video signal obtained from said recording medium; variable delay means for delaying an input signal by a time determined by a control input; second timing signal generation means for generating a second timing signal for causing said variable delay means to act as a fixed delay line; memory means for storing an output from said variable delay means in accordance with a command signal and capable of storing an amount of data corresponding to at least one field; first signal selection means for selectively supplying one of a signal read from said memory and said video signal read from said recording medium to said variable delay means; second signal selection means for selectively supplying one of said first and second timing signals as said control input to said variable delay means in accordance with said command signal and correction means for processing said signal read from said memory, using the output from said variable delay means, in response to said command signal, so as to improve the quality of a picture reproduced from said signal read from said memory.

4,884,151

RECORDING AND/OR REPRODUCING APPARATUS WITH PHOTO-ELECTRIC IMAGE DEVICE

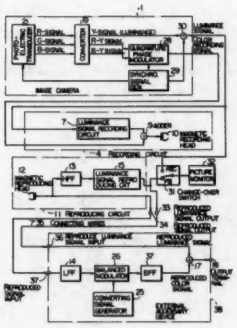
Masamitsu Ohtsu, Kadoma, and Hiroshi Taniguchi, Hirakata, both of Japan, assignors to Matsushita Electric Inductrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 793,441, Oct. 18, 1985, abandoned, which is a continuation of Ser. No. 547,456, Nov. 1, 1983, abandoned, which is a continuation of Ser. No. 180,579, Aug. 25, 1980, abandoned. This application Feb. 1, 1988, Ser. No. 153,564

Claims priority, application Japan, Sep. 3, 1979, 54-112576

Int. Cl.[4] H04N *9/491*

U.S. Cl. 358—330 **3 Claims**



1. An integrated system including an image camera and recording circuit for recording on video tape a color video signal including a color recording signal occupying a frequency band of relatively low frequency and a luminance recording signal occupying a frequency band higher than the frequency band occupied by the color recording signal, without forming a conventional composite color television signal as an intermediate step in producing the color video signal, comprising:

converter means for converting signals representative of the primary colors R, G and B into a luminance signal Y, an R-Y color difference signal, and a B-Y color difference signal;

synchronizing signal generator means for generating a synchronizing signal containing at least a horizontal synchronizing signal, a vertical synchronizing signal and a first carrier signal, the frequency of said first carrier signal being selected to be appropriate for directly recording the color recording signal on video tape;

adder means for combining the luminance signal Y with the synchronizing signal to produce a luminance output signal;

modulation means for modulation of the luminance output signal with a second carrier signal having a higher frequency than said first carrier signal to produce a luminance recording signal, the frequency of the second carrier signal being selected to be appropriate for the direct recording of the luminance recording signal on video tape in a relatively high frequency band;

quadrature phase modulator means responsive to the color difference signals and the first carrier signal for modulating the phases of said color difference signals to produce a color recording signal for direct recording on the video tape in a relatively low frequency band; and

adder means for receiving the luminance recording signal in a relatively high frequency band and the relatively low frequency color recording signal for producing the color video signal for recording on video tape without forming a conventional composite color television signal as an intermediate step in producing said color video signal.

4,884,152

METHOD FOR RESTORING TRACK 0

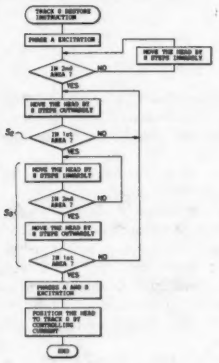
Jun Ide, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan

Continuation of Ser. No. 15,449, Feb. 17, 1987, abandoned. This application Dec. 28, 1988, Ser. No. 290,836

Claims priority, application Japan, Jun. 4, 1986, 61-128221

Int. Cl.[4] G11B *5/55, 5/596*

U.S. Cl. 360—78.14 **2 Claims**



1. A method for restoring a head to a track 0 in a disk drive unit in which an information recording medium formed in a shape of a disk is driven to be rotated and the head is moved by use of a stepping motor to effect a recording or reproducing of an information, the method being achieve by detecting a position of the track 0 at an outer-most location in a recording area of the information recording medium comprising the following steps of:

disposing a first area and a second area on the recording medium each for beforehand writing therein a servo information, said first and second areas being adjacent to each other in a rotational direction of the information recording medium;

writing the servo information in an area outside the track 0 in a portion of the first area, and writing the servo information in a portion of the second area inside the track 0, and writing the servo information configured alternately

in a zigzag shape in a preset portion of the first and second areas inside the recording area;

positioning the head to a position outside the track 0 by exciting the stepping motor;

returning the head thereafter toward an inner side to detect a position where the track 0 is found within a cycle of an excitation phase of the stepping motor;

positioning the head at a position separated from the track 0 by a preset number of steps; and

controlling thereafter a current ratio to effect an excitation on a preset excitation phase, thereby positioning the head to the position over the track 0.

4,884,153

SINGLE DRIVING SYSTEM FOR TAPE LOADING AND REEL MODE CONVERSION OF VCR

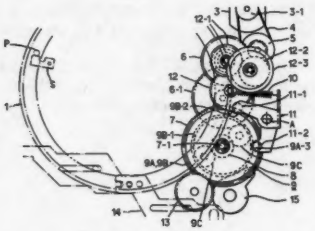
Hee K. Ahn, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd, Rep. of Korea

Filed May 12, 1987, Ser. No. 48,823

Claims priority, application Rep. of Korea, May 14, 1986, 1986-3741

Int. Cl.[4] G11B *15/61, 5/008*

U.S. Cl. 360—85 **6 Claims**



1. A single driving system for tape loading and reel mode conversion of a VCR including a head drum, a ring gear for tape loading and reel mode converting means, said single driving system comprising:

a single drive motor to perform the functions of tape loading and reel mode conversion;

a drive gear being rotated by the driving force of said drive motor transmitted through a first interlocking means;

a selective power transmission device which transmits successfully and discriminatingly the driving force of said drive motor, transferred from said drive gear, to said ring gear and said reel mode converting means through a second interlocking means under the control of a single control lever;

said power transmission device including:

a sun gear, having at least one planet gear connectively engaged with said sun gear such that said sun gear and said planet gear rotate in opposite directions,

a gear for tape loading, said ring gear being responsive to said gear for tape loading;

a gear for reel mode conversion, said reel mode converting means being responsive to said gear for reel mode conversion;

said gear for tape loading, said gear for reel mode conversion, and said sun gear being connectively engaged at a common axis; and

said gears for tape loading and reel mode conversion having a groove on their respective rims to receive a locking pin of said control lever, whereby when said locking pin is received by said groove of one of said gears, the driving force of said driving motor is transferred to that gear whose groove has not received said locking pin.

4,884,154

FLANGED TRANSDUCER SUPPORTING ARM FOR A MAGNETIC HEAD/ARM ASSEMBLY

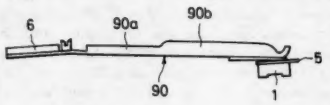
Shuji Onodera; Taichi Sato, both of Ibaraki; Kihachiro Tanaka, Ushiku; Yokuo Saitoh, Kanagawa; Hiroshi Daito, Odawara; Yoko Yamada, Tokyo; Yuzo Yamaguchi, Tsuchiura; Yoshinori Takeuchi, Ibaraki; Shigeo Hara, Kanagawa, and Shouichi Setone, Ebina, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 16, 1987, Ser. No. 97,170

Claims priority, application Japan, Sep. 19, 1986, 61-219511

Int. Cl.[4] G11B *5/48*

U.S. Cl. 360—104 **6 Claims**



1. A transducer supporting arm for use in a magnetic head/arm assembly, comprising a front end for supporting a magnetic transducer, a rear end for mounting to a drive unit of the assembly, side edges between the front end and the rear end, and flanges provided along the side edges,

wherein the flanges comprise first flanges of one height extending from the rear end toward the front end to an intermediate position, and second flanges of a second height greater than the one height extending from the front end toward the rear end to the intermediate position, and a step joining each of the first flanges with the respective second flanges at the intermediate position.

4,884,155

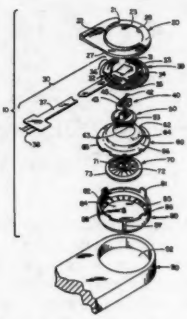
SELF-LOADING HEAD ASSEMBLY FOR DISK DRIVES

John L. Spash, Harvard, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Dec. 4, 1987, Ser. No. 128,802

Int. Cl.[4] G11B *5/54*

U.S. Cl. 360—105 **17 Claims**



2. A head assembly for supporting a slider in a loaded position juxtaposed a rotating disk comprising:

A. expandable bellows means having a rigid upper housing member adapted to be mounted on an actuator arm and a flexible lower diaphragm member affixed in sealing relationship thereto to form an airtight seal to form an air chamber, said slider being mounted on said diaphragm member sidewall and an opposed sidewall for supporting said slider said bellows means having an expanded condition in which it supports said slider proximate said disk

and a collapsed condition in which it supports said slider distal said disk;

B. retraction means connected to said bellows means for urging said bellows to its collapsed condition; and

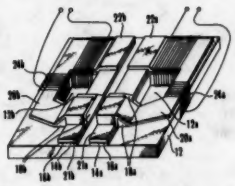
C. air interception means connected to said bellows means for intercepting air entrained with said disk and directing it into said bellows means to facilitate expansion of said bellows means.

4,884,156

MAGNETIC HEAD HAVING A THIN-FILM AND A COIL

Hideaki Miyakawa, Kanagawa, and Makoto Kameyama, Chiba, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 80,172, Jul. 30, 1987, abandoned, which is a continuation of Ser. No. 693,499, Jan. 22, 1985, abandoned.
This application Mar. 27, 1989, Ser. No. 330,925
Claims priority, application Japan, Jan. 26, 1984, 59-12490
Int. Cl.[4] G11B 5/29
U.S. Cl. 360—121 4 Claims



1. A multi-track magnetic head comprising:

(a) a non-magnetic block having a first plane surface and a pair of penetration holes respectively formed in a direction crossing with the first plane surface;

(b) a pair of lower magnetic thin film layers, each of which forms at least a part of a magnetic core and is deposited on the first plane surface, said pair of lower magnetic thin film layers having a common plane surface arranged to be parallel with the first plane surface;

(c) a pair of non-magnetic thin films, each of which operates as a transducing gap of the magnetic head and is deposited on the common plane surface, a distance between the pair of non-magnetic thin films being smaller than a distance between that of the pair of penetration holes;

(d) a pair of upper magnetic thin film layers, each of which has a part deposited on each of said pair of non-magnetic thin films, a pair of magnetic cores consisting of said pair of lower magnetic thin film layers and said pair of upper magnetic thin film layers and being arranged to enclose around said pair of penetration holes on the first plane surface; and

(e) a pair of wire-form coils wound around said non-magnetic block and said pair of magnetic cores through said pair of penetration holes.

4,884,157

THIN FILM MAGNETIC HEAD WITH COIL WINDINGS RECEIVING TRENCH

Gary E. Roberts, Santa Barbara, and James Reid, Santa Ynez, both of Calif., assignors to Applied Magnetics Corporation, Goleta, Calif.

Filed Jul. 28, 1987, Ser. No. 78,909
Int. Cl.[4] G11B 5/127
U.S. Cl. 360—125 9 Claims

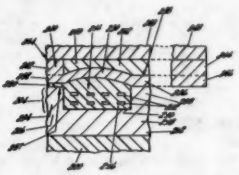
1. A thin film magnetic head comprising

a substrate formed of a material which is highly resistive to being abraded by a magnetic media being moved thereacross;

a bottom pole piece located on said substrate, said bottom pole piece having a front gap section and a rearwardly extending portion with the front gap section thereof positioned at a predetermined location on said substrate and with the rearwardly extending portion thereof located rearward of and spaced from the front gap section;

a lateral wall formed of a magnetic material having a forward wall section and a rearward wall section defining a coil windings receiving trench therebetween, said lateral wall being formed of predetermined thickness and being positioned on said bottom pole piece with the forward wall section contiguous the front gap section of said bottom pole piece establishing the forward wall section as one side of a transducing gap and with the rearward wall section being positioned a predetermined distance rearward from the front wall section and contiguous the rearwardly extending portion of said bottom pole piece forming one side of a rear magnetic closure section, the coil windings receiving trench being positioned on said bottom pole piece rearward of the front gap section and forward of the rear magnetic closure section with said bottom pole piece located between the forward wall section and the rearward wall section forming a bottom enclosure for the coil windings receiving trench;

a coil having a plurality of coil windings formed on said bottom pole piece and having a thickness which is less than the thickness of said lateral wall, said coil having a portion of the coil windings located in the coil windings receiving trench and the remaining portion thereof extending from the coil windings receiving trench rearward on the rearwardly extending portion of said bottom pole piece and beyond the rear magnetic closure section;



an insulating structure having a thin gap defining portion and a thick coil windings enclosing portion wherein the thin gap defining portion of said insulating structure is formed of predetermined thickness and is located on the forward wall section of said lateral wall to establish the thickness of a transducing gap and wherein the thick coil windings enclosing portion encloses and surrounds that portion of the coil windings located in the coil windings receiving trench;

a top pole piece having a front gap section and a rear magnetic closure portion with the front gap section positioned on the thin gap defining portion of said insulating structure and adjacent the front gap section of said bottom pole establishing the front end section of said top pole piece as the other side of the transducing gap and with the rear magnetic closure portion thereof contiguous the rearward wall section of said lateral wall establishing a rear magnetic closure portion of said top pole piece as the other side of a rear magnetic closure section, the bottom surface of said top pole piece bridging from the forward wall section to the rearward wall section of said lateral wall forming a top enclosure for the coil windings receiving trench; said top pole piece having a contoured outer surface having a step formed therein and having a rearward support section;

a leveler layer formed of a material having substantially the same abrading characteristics as that of the top pole piece and having a thickness which is slightly greater than the height of the step of said top pole piece and having a forward leveler section located on the front gap section of said top pole piece, and a rearward leveler section located

on a support section positioned a predetermined distance from and rearward of the forward leveler section of said leveler layer and rearward of the transducing gap, the forward leveler section and rearward leveler section being adapted to receive and support a superstrate attached to said magnetic head by an adhesive means substantially located between the forward leveler section and the rearward leveler section.

4,884,158

MAGNETIC TAPE CASSETTE HAVING A SPRING-BIASED FRONT PANEL AND LOCKING MEMBER

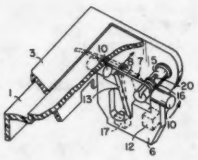
Albert Pertzsch, Munich; Hubert Brunner, Weil, and Ludwig Zeroni, Ottobrunn, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 793,183, Oct. 31, 1985, abandoned. This application May 13, 1987, Ser. No. 49,288

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1984, 3441156

Int. Cl.[4] G11B *23/087*

U.S. Cl. 360—132 **5 Claims**



1. In a cassette for magnetic video tape, the combination of
a two part housing with
an upper housing
a lower housing
said upper and lower housings each having side walls and a front wall formed with apertures,
a front panel pivotally mounted on the side walls so as to have an open position and a closed position with respect to the apertures wherein the front panel covers said apertures when in said closed position, and permits access through said apertures when in said open position,
side parts of the front panel partly overlapping the side walls,
at least one peg carried on the inside of said side and extending towards the inside of the cassette, and
having a recess formed in said peg,
a coil spring mounted on said peg, having a long leg and a short leg forming the respective ends of the coil,
said short leg being seated in the peg recess to fix the coil spring on the peg,
a locking plate mounted on the lower housing half, means for swiveling the plate on supports in the lower half having a plane oriented along the height dimension so that the plane is positioned inside of the front part of the side walls and the side parts of the front panel,
said plate swiveling on the axis of rotation of said swiveling means,
means on the plate for engaging the front panel so as to hold the panel in said closed position over the apertures when the plate is engaged with the front panel and to be disengageable upon swiveling of the plate,
a projection of said plate extending obliquely from the plane of the plate along the height dimension and having a surface offset from the axis of rotation of the swivel means,
the projection being constructed to that the long leg engages the projection surface and upper housing half and applies a force producing an angular moment in the plate.

4,884,159

BRAKING ARRANGEMENT IN A MAGNETIC TAPE CASSETTE

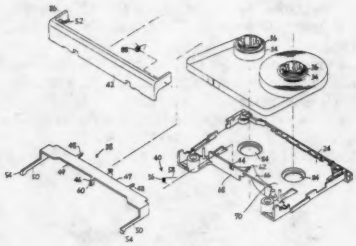
Takateru Satoh, Nagano, Japan, assignor to TDK Corporation, Japan

Filed Oct. 30, 1987, Ser. No. 115,534

Claims priority, application Japan, Nov. 5, 1986, 61-169003[U]; Nov. 5, 1986, 61-169004[U]

Int. Cl.[4] G11B *23/04*

U.S. Cl. 360—132 **6 Claims**



1. A magnetic tape cassette, comprising:
a casing comprising an upper casing member and a lower casing member connected together;
a pair of reel hubs rotatably arranged in said casing and having a magnetic tape wound thereon;
lock means provided at a portion of each of said reel hubs above said magnetic tape wound thereon;
a hub brake slidably arranged in said casing and releasably engaged with said lock means, said hub brake having one side opposite to said reel hubs and the other side opposite to said one side;
a hub brake spring provided in said casing so as to force said hub brake toward said lock means of each of said reel hubs to selectively engage said hub brake with said lock means;
a front cover pivotally mounted at said casing so as to selectively close and open a front portion of said casing due to its pivotal movement;
said front cover selectively engaging with said hub brake to release engagement of said hub brake with said lock means against said hub brake spring;
a springe engagement provided on said other side of said hub brake so as to be engaged with said hub brake spring;
wherein said hub brake spring includes a coil portion supported on said lower casing member and an extension held on said spring engagement;
wherein said spring engagement comprises an arm-like projection mounted on said hub brake so as to downwardly extend therefrom, said arm-like projection being bent at a tip end thereof for securely holding said extension on said spring engagement;
and additionally comprising
a spring support provided on said lower casing member for support said hub brake spring;
an abutment provided on said lower casing member for provisionally holding said extension of said hub brake spring engaged with said spring engagement of said hub brake; and
a release element provided at said upper casing member for releasing said extension of said hub brake spring held on said abutment to transfer said extension to said spring engagement;
wherein said lower casing member is provided at an upper end thereof with a wall member for supporting said hub brake thereon;
wherein said abutment comprises a prominence provided on said wall member along a cutout formed at said wall

member for inserting said extension of said hub brake spring therethrough under said wall member;

wherein said release element of said upper casing member comprising a projection provided on an inner surface of said upper casing member so as to downwardly extending therefrom, said projection being formed at a tip end thereof with an oblique surface portion which pushingly releases said hub brake spring held on said abutment of said lower casing member therefrom;

wherein said spring engagement of said hub brake spring is positioned so as to receive said extension released from said abutment at a position below said wall member;

wherein said wall member is provided with an overhang portion; and

wherein said extension of said hub brake spring is arranged to be overlapped by said overhang portion of said wall member;

whereby when said hub brake is incorporated in said lower casing member, said hub brake spring is temporarily held on said abutment of said lower casing member, and

when said upper and lower casing members are then combined, said lower oblique surface portion of said release element provided on the inner surface of said upper casing member, releases said extension of said spring being provisionally held upon the abutment of the lower casing member and moves the extension through said cutout to a position under said wall member,

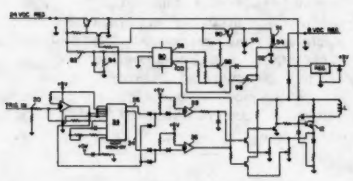
so that said spring does not act upon said hub brake until said upper casing member is combined with said lower casing member to cause said reel hubs to be aligned, and effectively preventing inclining or lifting of said reel hubs, and providing smooth assembly of said cassette.

4,884,160

CONSTANT CURRENT ACTUATOR FOR INDUCTIVE LOAD

Stephen T. Pasquarella, Rochester, N.Y., assignor to VA Inc., Rochester, N.Y.

Continuation of Ser. No. 129,162, Dec. 7, 1987, abandoned. This application Mar. 10, 1989, Ser. No. 320,885
Int. Cl.[4] H01H *47/32*
U.S. Cl. 361—18 **2 Claims**



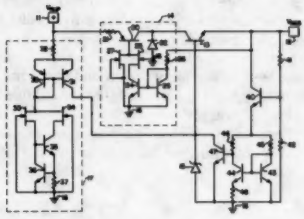
1. A circuit for energizing an inductive load comprising: a first source of direct current having a low internal impedance and a first voltage, a second source of direct current having a low internal impedance and a second voltage lower than said first voltage, switching means for selectively connecting a load across said sources, timed control means responsive to an input signal for controlling said switch means so that switch means connects the load continuously across said first source for a predetermined initiating interval immediately following the beginning of the input signal and continuously across said second source immediately following the initiating interval until the end of the input signal, and current control means including a feedback loop for limiting the maximum current through the load to a first predetermined constant value during the initiating interval and to a second, lower, constant value thereafter until the end of the input signal.

4,884,161

INTEGRATED CIRCUIT VOLTAGE REGULATOR WITH TRANSIENT PROTECTION

James H. Atherton, and Silvo Stanojevic, both of Freeport, Ill., assignors to Honeywell, Inc., Minneapolis, Minn.

Continuation of Ser. No. 498,343, May 26, 1983, abandoned. This application Mar. 10, 1986, Ser. No. 839,453
Int. Cl.[4] H02H *9/02, 3/20*
U.S. Cl. 361—18 **27 Claims**



24. An integrated circuit voltage regulator with improved protection against excessive voltage excursions, comprising:

a supply terminal for receiving electrical current, at a voltage which may have substantial superimposed excursions of positive or negative polarity relative to a reference voltage;

a source of the reference voltage;

a bipolar regulator pass transistor of a first conductivity type having a base electrode and first and second additional electrodes, said pass transistor being susceptible to electrical breakdown when positive or negative voltages in excess of first and second predetermined magnitudes respectively are impressed between the base electrode and the first additional electrode, the first and second predetermined magnitudes being less than the magnitudes of the voltage excursions which may be present at said supply terminal;

first base drive means for supplying a substantially constant voltage to the base electrode of said pass transistor;

diode means connected between said source of the reference voltage and the first additional electrode of said pass transistor for limiting voltage excursions of the first polarity to less than the first predetermined magnitude;

a bipolar transistor of a second conductivity type having a base electrode and first and second additional electrodes;

first connecting means connecting the first electrodes of said bipolar transistors of first and second conductivity types;

second connecting means connecting said supply terminal to the second terminal of said transistor of the second conductivity type; and

second base drive means for supplying a substantially constant current to the base of said transistor of the second conductivity type.

4,884,162

METHOD AND APPARATUS FOR PREVENTING THE OVERHEAT OF A LINE FEED MOTOR FOR A PRINTER

Toshikazu Ito; Toshiro Suemune, and Katsuhiko Sato, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 25, 1988, Ser. No. 224,001
Claims priority, application Japan, Jul. 24, 1987, 62-183732
Int. Cl.[4] H02H *6/00*
U.S. Cl. 361—23 **2 Claims**

1. An apparatus for preventing the overheating of a line feed motor, said apparatus comprising:

a first timer means for measuring a predetermined first time interval;

a second timer means for measuring a predetermined second time interval;

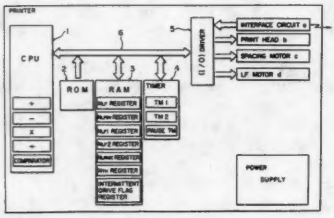
a counting and calculating means for counting a number of line feed pulses of said line feed motor during each of said first time interval and said second time interval, and for adding the thus counted number of line feed pulses to a previously updated sum of line feed pulses to obtain a new sum of line feed pulses at the end of each of said first time interval and said second time interval;

a first subtracting means for subtracting a first allowable line feed pulse number from said new sum of line feed pulses to obtain a newly updated sum of line feed pulses at the end of said first time interval;

a second subtracting means for subtracting a second allowable line feed pulse number from said new sum of line feed pulses to obtain said newly updated sum of line feed pulses at the end of said second time interval;

a control means for controlling activation of said line feed motor, for activating said first timer means, for determining whether said newly updated sum of line feed pulses at the end of said first time interval is a positive number, for reactivating said first time means when said newly updated sum of line feed pulses at the end of said first time interval is a nonpositive number, for activating said second timer means when said newly updated sum of line feed pulses at the end of said first time interval is a positive number, for determining whether said newly updated sum of line feed pulses at the end of said second time interval is a positive number, for activating said first timer means when said newly updated sum of line feed pulses at the end of said second time interval is a nonpositive number, and for reactivating said second timer means when said newly update sum at the end of said second time interval is a positive number;

wherein a cessation period for deactivation of said line feed motor is provided during a portion of said second time interval, whereby said cessation period allows for heat dissipation of said line feed motor.



4,884,163

CONDUCTIVE POLYMER DEVICES

Marguerite E. Deep, Los Altos, and Nelson H. Thein, Fremont, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 711,909, Mar. 14, 1985, Pat. No. 4,774,024. This application Apr. 5, 1988, Ser. No. 177,720

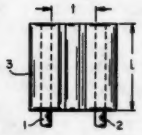
Int. Cl.[4] H02H *5/04*

U.S. Cl. 361—58 **7 Claims**

6. A circuit protection device which has a resistance at 23° C. of less than 100 ohms and which comprises a PTC element and two metal electrodes which can be connected to a source of electrical power to cause current to pass through the PTC element, the PTC element being composed of a conductive polymer composition which exhibits PTC behavior, which has been cross-linked by radiation, which has a resistivity at 23° C. of less than 100 ohm.cm and which comprises

(1) a crystalline polymeric component;

(2) carbon black which is dispersed in the polymeric component;



(3) alumina trihydrate; and

(4) a lubricant or a coupling agent for the alumina trihydrate.

4,884,164

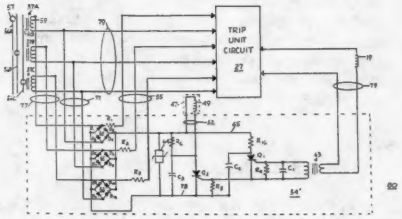
MOLDED CASE ELECTRONIC CIRCUIT INTERRUPTER

Richard A. Dziura; Ronald R. Russell, both of Plainville, and Graham A. Scott, Avon, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Feb. 1, 1989, Ser. No. 305,341

Int. Cl.[4] H02M *3/053*

U.S. Cl. 361—97 **23 Claims**



1. A circuit interrupter comprising:

a case and a cover;

a pair of separable contacts within said case under control of an operating mechanism;

an electronic trip circuit within said cover connected with a first trip coil to articulate said operating mechanism and separate said contacts upon occurrence of first overcurrent conditions through said contacts; and

a second trip coil connected to said first trip coil to articulate said operating mechanism and separate said contacts upon occurrence of second overcurrent conditions through said contacts.

4,884,165

DIFFERENTIAL LINE DRIVER WITH SHORT CIRCUIT PROTECTION

Samuel K. Kong, Union City; William Y. Jiang, Sunnyvale, and Wallace C. W. Chan, Cupertino, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Nov. 18, 1988, Ser. No. 274,319

Int. Cl.[4] H02H *3/00*

U.S. Cl. 361—98 **20 Claims**

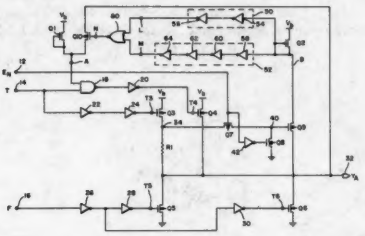
1. A line driver circuit having short-circuit protection comprising:

primary pull-up transistor means connected between a first voltage reference level and an output terminal for providing a primary current to said output terminal;

a secondary pull-up transistor means coupled between said first voltage reference level and said output terminal for providing a secondary current to said output terminal; and

means for disabling conduction of said primary current through said primary pull-up transistor means in response

to said secondary current through said secondary pull-up transistor means exceeding a predetermined level for a period greater than a predetermined time period, wherein the means for disabling conduction of said primary current through said primary pull-up transistor means includes means for providing a fault signal which is active when said secondary current in said secondary pull-up transistor means exceeds said predetermined level; wherein the means for disabling conduction includes logic gate and means for inhibiting input drive signals to said primary pull-up transistor means;



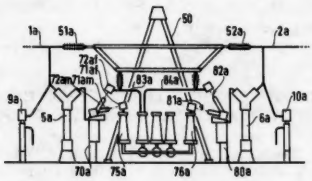
means for determining that said fault signal is active for greater than said predetermined time period, said determining means providing a cutoff signal which is active to disable conduction of said primary current through said primary pull-up transistor means, wherein the means for determining that said fault signal is active includes means for delaying said fault signal for a time greater than said predetermined time period to provide a delayed fault signal and includes means for comparing said fault signal and said delayed fault signal to provide said cutoff signal to disable conduction of said primary current when said fault signal and said delayed fault signal are active at the same time.

4,884,166

ELECTRICITY STATION

Edmond Thuries, Pusignan, and Jean-Paul Masson, Villeurbanne, both of France, assignors to Societe Anonyme dite : Alsthom, Paris Cedex, France

Filed Aug. 3, 1988, Ser. No. 227,933
Claims priority, application France, Aug. 3, 1987, 87 10987
Int. Cl.[4] H02B *5/00*
U.S. Cl. 361—333 **6 Claims**



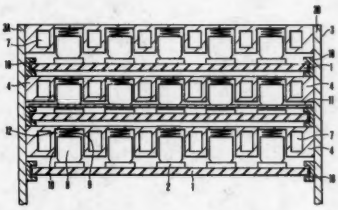
1. A hybrid outdoor electricity transmission station for coupling at least one air-insulated electric transmission line to output feedthroughs, through a circuit including at least one circuit breaker series connected with at least one section switch by means of at least one set of three phase busbars, the improvement wherein said circuit breakers are of outdoor type, said section switches are of telescopic, open air type, and said at least one set of busbars is of the metal-clad type including a sheath containing dielectric gas under pressure.

4,884,167

COOLING SYSTEM FOR THREE-DIMENSIONAL IC PACKAGE

Shinji Mine, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 8, 1988, Ser. No. 268,467
Claims priority, application Japan, Nov. 9, 1987, 62-283454; Nov. 9, 1987, 62-283455
Int. Cl.[4] H01L *23/40*
U.S. Cl. 361—382 **5 Claims**



1. A cooling system for a three-dimensional IC package in which substrates each mounting a plurality of IC devices on at least one surface thereof are laminated with a predetermined interval therebetween in a chassis, comprising:

cold plates, fixed parallel to each other in said chassis with a predetermined interval therebetween for housing said substrate, holes being formed in each of said cold plates at positions corresponding to heat radiating surfaces of said IC devices when said substrate is inserted in said interval, and a cooling fluid path for flowing a fluid being formed around said holes;

at least one heat conductive piston, inserted in each of said holes of said cold plate while a small gap is kept between an inner wall of said hole and said heat conductive piston, vertically biased by spring means to vertically move in said hole, and when said IC devices operate, biased by said spring means and brought into contact with said heat radiating surface of a corresponding one of said IC devices, and conducting heat generated from said IC device to said cold plate through said gap; and

heat conductive piston adjusting means for releasing, when maintenance of said substrate is to be performed, a contact between said heat conductive piston and said IC device against a biasing force of said spring means, thereby enabling insertion/removal of said substrate with respect to said chassis.

4,884,168

COOLING PLATE WITH INTERBOARD CONNECTOR APERTURES FOR CIRCUIT BOARD ASSEMBLIES

Melvin C. August; Eugene F. Neumann; Stephen A. Bowen, and John T. Williams, all of Chippewa Falls, Wis., assignors to Cray Research, Inc., Chippewa Falls, Wis.

Filed Dec. 14, 1988, Ser. No. 284,992
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—382 **4 Claims**

1. An improved cooling system for stacked printed circuit boards, comprising:

(a) a cooling plate, said cooling plate formed by joining two plates of heat conductive material, and said cooling plate adapted to be interposed between the printed circuit boards;

(b) fluid inlet means joined to said cooling plate;

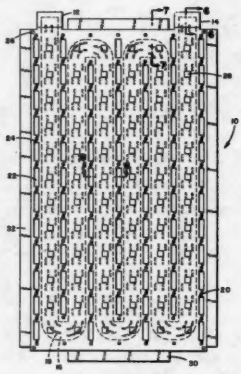
(c) fluid outlet means joined to said cooling plate;

(d) fluid pass means disposed within said cooling plate, said fluid pass means connecting said fluid inlet means and fluid outlet means such that a cooling liquid can flow from said fluid inlet means through said cooling plate to said

fluid outlet means so as to dissipate heat from said cooling plate;

(e) a plurality of heat-dissipating fins disposed within said fluid pass means, said fins adapted to transfer heat from said cooling plate to the cooling liquid;

(f) a plurality of heat conductive pads disposed on the outer



surface of said cooling plate for engaging the printed circuit boards; and

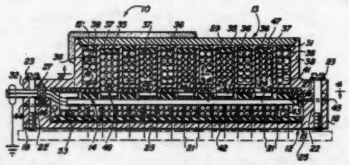
(g) means in said cooling plate defining a plurality of apertures, each adapted to receive a z-axis connector assembly such that electrical interconnections may be made between the printed circuit boards disposed on either side of said cooling plate.

4,884,169

BUBBLE GENERATION IN CONDENSATION WELLS FOR COOLING HIGH DENSITY INTEGRATED CIRCUIT CHIPS

John M. Cutchaw, Scottsdale, Ariz., assignor to Technology Enterprises Company, Scottsdale, Ariz.

Filed Jan. 23, 1989, Ser. No. 299,795
Int. Cl.[4] H05K *7/20*
U.S. Cl. 361—385 **25 Claims**



1. An apparatus for containing and cooling a high-density integrated circuit package comprising in combination:

a base,

a high-density integrated circuit mounted on said base,

a heat exchanger mounted on said base to enclose said circuit and carry away the operational heat thereof by means of a coolant which is passed through said heat exchanger,

said heat exchanger comprising a housing having an especially configured thermally conductive wall for providing an elongated tunnel over said circuit,

said tunnel being closed at one end and open at its other end which other end is juxtapositioned to said circuit,

a plurality of thermally conductive spheroids arranged in said tunnel and biased into thermally conductive contact with each other, with said circuit and said wall forming said tunnel to maximize heat transfer from said circuit to said wall, and

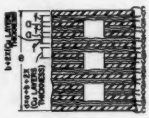
a particle centrally positioned in said spheriods in said tunnel at a point juxtapositioned to said circuit for catalytically enhancing bubble nucleation growth around said circuit.

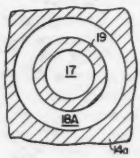
4,884,170

MULTILAYER PRINTED CIRCUIT BOARD AND METHOD OF PRODUCING THE SAME

Nobuaki Ohki; Norio Sengoku, both of Hadano, and Fumiyuki Kobayashi, Sagamihara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 14, 1983, Ser. No. 484,891
Claims priority, application Japan, Apr. 16, 1982, 57-62410
Int. Cl.[4] H05K *1/11*
U.S. Cl. 361—414 **7 Claims**





1. A method of producing a multilayer printed circuit board the method comprising the steps of:

(a) forming an electric source or ground layer and a signal circuit layer on opposite copper-plated surfaces of each of a plurality of copperplated lamination insulating plates, said electric source or ground layer and said signal circuit layer being respectively disposed on opposite surfaces; and

(b) stacking and bonding said plurality of copperplated plates each subjected to the processing in step (a) so as to dispose said signal circuit layer and said electric source or ground layer alternately.

4,884,171

ELECTROMAGNETIC INTERFERENCE SHIELDING DEVICE FOR A PORTABLE AIRCRAFT ENGINE TESTER

William L. Maserang, Fort Worth, and John W. Wright, Arlington, both of Tex., assignors to Howell Instruments, Fort Worth, Tex.

Filed Dec. 15, 1988, Ser. No. 284,729
Int. Cl.[4] H05K *5/04*
U.S. Cl. 361—424 **17 Claims**

1. A portable apparatus for shielding from EMI a portable aircraft engine tester having a plurality of aircraft engine measurement signal inputs that input measurement signals obtained from an aircraft engine, an electrical power input for inputting electrical power, and switches for controlling the aircraft engine tester, the portable shielding apparatus comprising:

a portable, seamless, conductive, outer casing having a bot-

tom, four sides, and an open top, at least one of said sides including at least one side opening;

a conductive filter box disposed within said outer casing so that a back side of said filter box is connected to said outer casing and covers said at least one side opening, said filter box including:

a plurality of holes located on said back side of said filter box within an area that corresponds to said at least one side opening, and

a plurality of holes located on another side of said filter box;

a first EMI gasket disposed between said connected filter box and said outer casing;

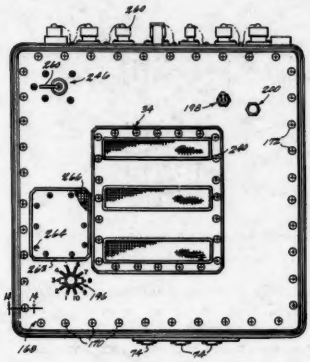
a connector disposed within each of said plurality of holes on said back side of said filter box, said connectors having input contact points;

a plurality of second EMI gaskets disposed between said plurality of connectors and said filter box;

a plurality of EMI filters disposed within said filter box, each filter mounted at an end to one of said plurality of holes on said another side of said filter box, and including:

at least one thermocouple EMI filter for filtering a thermocouple measurement signal, said thermocouple filter containing an inductor wrapped with constantan wire,

at least one DC signal EMI filter for filtering a DC measurement signal,



at least one AC signal EMI filter for filtering an AC measurement signal, and

at least one power EMI filter for filtering an electrical power input signal;

a conductive deck having a plurality of holes and at least one top opening, said conductive deck connected to said sides of said outer casing to enclose said top of said outer casing;

a display window covering said at least one top opening, said display window including:

a conductive bezel that covers said at least one top opening and is connected to an outside of said deck,

a third EMI gasket disposed between said bezel and said deck,

a transparent plastic window disposed on an inside of said deck,

a conductive woven screen that is larger than and covers said plastic window so that a periphery of said woven screen that touches an inside of said deck,

a fourth EMI gasket disposed over said conductive woven screen, and

a conductive backup plate disposed over said fourth EMI gasket for causing a compressive fit of said woven screen and fourth EMI gasket on an inside of said instrument; and

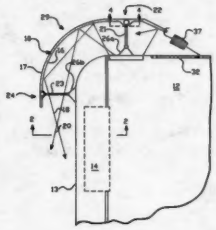
a plurality of EMI switch coverings, one EMI switch covering for each of said switches.

4,884,172

AUTOMOTIVE SAFETY DEVICE FOR SIDE LIGHTING

James W. Walker, 145 Turnsworth Ave., Redwood City, Calif. 94062

Filed Jan. 17, 1989, Ser. No. 297,028
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 362—61 **5 Claims**



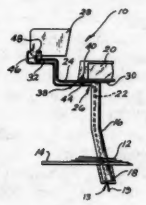
3. In an automotive safety device for use with a vehicle having a front with peripheral headlights and a side surface with wheel wells, an elongated flexible reflective strip with two ends and having a width substantially the same as the height dimension of said headlight, means for removably attaching said strip to said vehicle, including first means for positioning one end of said sheet opposite a said headlight and offset therefrom and second means for removably attaching the other end of said strip to a side of said vehicle and offset therefrom for providing a curved sheet which reflects light from said headlight rearwardly by diverse light rays reflected by said curved sheet along the side of said vehicle to illuminate at least one of said wheel wells.

4,884,173

COMBINATION RUNNING LIGHT AND SPOT LIGHT DEVICE FOR A BOAT

Jerald L. Cassidy, 500 Autum Circle, Corbin, Ky. 40701

Filed Jan. 12, 1989, Ser. No. 296,006
Int. Cl.[4] B60Q *1/00*
U.S. Cl. 362—61 **14 Claims**



1. A combination running light and spot light device for a boat comprising:

a female receptacle having electrical connectors therein for attachment to a boat hull;

a mast having a male fitting at, its bottom end receivable in the female receptacle and having electrical connectors for completing an electrical connection with the electrical connectors of the female receptacle;

a running light attached to the top end of the mast;

an electrical circuit interconnecting the running light and the electrical connector of the male fitting;

a bracket mounted to the mast proximate the top end thereof for selected pivotal movement about the longitudinal axis of the mast;

means for securing the bracket at a selected position about the longitudinal axis of the mast;

a spot light mounted to the bracket for movement with the bracket about the longitudinal axis of the mast; and,

an electrical circuit interconnecting the spot light and the electrical connector of the male fitting.

4,884,174

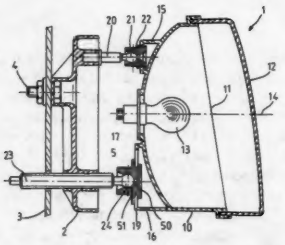
ATTACHMENT AND HINGING COMPONENT, ESPECIALLY FOR A DEVICE TO ADJUST AN OPTICAL ELEMENT, PARTICULARLY FOR A MOTOR VEHICLE HEADLIGHT

Guy Dorleans, Boulogne, France, assignor to Valeo Vision, Cedex, France

Filed May 6, 1988, Ser. No. 190,821

Int. Cl.[4] B60Q *1/00*

U.S. Cl. 362—61 **5 Claims**



1. In an assembly for adjusting the position of an optical element body such as a motor vehicle headlight with respect to a fixed support part, the assembly including an adjustment screw mounted in said fixed support and which is adapted to be threadably adjusted with respect to the fixed support part and which has formed at one end thereof a swivel joint connected to one side of the optical element body, pivot means connecting another side of said optical element body with said fixed support part,

said swivel joint including an attachment and hinging component having a base and a concave seat engagable with a ball section of said adjustable screw and adapted for pivotal movement relative thereto upon adjustment of said adjustment screw, said base being slidably receivable in a slot formed in said optical element body and extending substantially perpendicular to the axis of said adjustment screw and having lateral edges, said base having two rectilinear and mutually parallel grooves engagable with said lateral edges of said slot for guiding said attachment and hinging component in translation during adjustment of said adjustment screw with respect to the fixed support part to pivot said optical element body about said pivot means.

4,884,175

TIRE-PRESSURE AND DEPTH GAUGE WITH ILLUMINATION COMPONENT

Hsi-Kuang Weng, 2nd Fl., No. 29, Wu Cheng Street, Ban Chyan, Taipei Hsien, Taiwan

Filed Jun. 14, 1988, Ser. No. 206,424

Int. Cl.[4] B25K *23/18*; B60C *23/02*

U.S. Cl. 362—119 **4 Claims**

1. A combination device with components for determining the tire pressure, the depth of tread of a tire, and for illumination, comprising:

a compact housing body defining first and second hollow chambers of cylindrical configuration, said second hollow chamber defining a threaded portion, and said housing having a formation providing an aperture for a respective key ring;

a nozzle formation provided at said first hollow chamber, said nozzle formation being in conformity with a tire valve and said nozzle formation including a bottom, a protrusion adapted to actuate a valve stem of a tire valve and an adjacent slot connecting said nozzle formation to said first hollow chamber;

a pad located at said bottom about said protrusion;

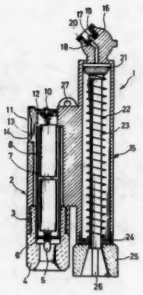
a sleeve member providing an annular edge forwardly of said nozzle formation and in contact with said pad;

a conical piston arranged in said first chamber; a first spring in said first hollow chamber for biasing said piston;

a member including a scale and whose lower end comprises a slender rod for taking readings of tire pressure and tire tread depth, this member being disposed inside said first spring;

a ring block which has a hole in the center, enabling the passage of said member, and which permits operative motion but precludes inadvertent sliding of said member;

a transparent hollow base with an aperture for said member to extend therethrough and a recess formation of conic shape widening towards the free end of said base;



a transparent shade which is hollow and has exterior threads at one end for connection at the threaded portion of said second hollow chamber;

a metal ring secured at said transparent shade;

a light bulb secured at said metal ring;

a metal cylinder disposed in said second hollow chamber with one end adjacent said ring;

at least one battery cell arranged in said metal cylinder between said light bulb and a respective second spring;

a cover including a conductive clip secured by a respective fastener at that end of said metal cylinder which is opposite said end adjacent said metal ring;

a second spring disposed between said battery and said cover; and

a fastener for securing said cover at said second chamber;

said bulb, said metal ring, and said metal cylinder, in said second hollow chamber providing a circuit of the illumination component, and said nozzle formation, said conical piston, said first spring, and said member including said scale respectively providing the tire pressure gauge and tread measuring components.

4,884,176

TRI-VIEW MIRRORED CABINET WITH PERIPHERAL LIGHTING

James J. Palka, Kildeer, and Robert B. Rekart, Villa Park, both of Ill., assignors to Pace Industries, Inc., Chicago, Ill.

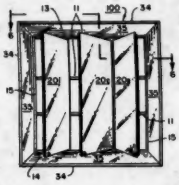
Filed May 31, 1988, Ser. No. 200,364

Int. Cl.[4] F21V *33/00*

U.S. Cl. 362—135 **2 Claims**

1. In a tri-view medicine cabinet comprising an open enclo-

sure-forming cabinet having a front edge about said cabinet with at least one central access door having an outer mirrored surface for forming a closure of the cabinet and on each side of said central access door a pivotal side access door having a mirror supported thereon forming a part of the closure of said cabinet for reflecting at least a partial side view of an object positioned before said central access door, the improvement comprising light emitting means comprising a plurality of fluorescent lamp tubes positioned about the entire periphery of said open enclosure-forming cabinet for directing diffused light upon an object positioned before said central access door with a portion of each one of said fluorescent lamp tubes extending beyond said front edge of said open enclosure-forming cabinet to project shadow-free light on an object positioned before said



mirrored central access and side access cabinet doors, said plurality of fluorescent lamp tubes being supported in a chase formed as an integral part of said tri-view medicine cabinet by the outer peripheral walls of the enclosure-forming cabinet and finishing panels positioned outwardly about said outer peripheral walls of the enclosure-forming cabinet and spaced therefrom by support panels connected between said outer peripheral walls of the enclosure-forming cabinet and said finishing panels, said finishing panels extending outwardly beyond said front edge of said open enclosure-forming cabinet for directing the light inwardly toward said central access door, and a translucent light diffusing panel means positioned adjacent each one of said plurality of fluorescent lamp tubes for diffusing and distributing the light emitted therefrom.

4,884,177

FLEXIBLE TORCH

Burke C. Pullman, Appt. 19G, 939, Coast Blvd., La Jolla, Calif. 92037

Filed Feb. 11, 1988, Ser. No. 154,595

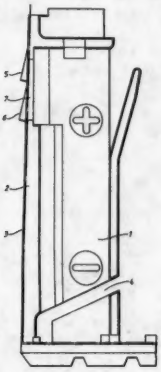
Claims priority, application United Kingdom, Feb. 13, 1987, 8703342

The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.

Int. Cl.[4] F21L 7/00

U.S. Cl. 362—189 **11 Claims**

1. A torch having a tray adapted to receive battery means and to locate a bulb, a cover which fits over the tray to confine the battery means and over the bulb to define a zone of direct illumination by the bulb, a mirror mounted on one side of the torch, and light diffusion means, at least partially formed by



said cover, whereby light from said bulb is shed towards another zone, facing said mirror, exclusive of the first zone.

4,884,178

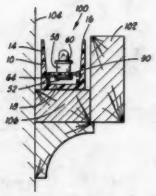
INDIRECT LIGHTING FIXTURE

James R. Roberts, 4501 N. Western, Oklahoma City, Okla. 73118

Filed Mar. 13, 1989, Ser. No. 322,006

Int. Cl.[4] F21V 1/00

U.S. Cl. 362—241 **6 Claims**



1. A lighting fixture for indirect lighting applications comprising:

a mounting member in the form of an elongated generally U-shaped extrusion of reflective material having a base panel and right angularly extending side panels having inner and outer surfaces, each of said side panel inner surfaces being formed with an elongated groove extending therealong proximate and equi-distant from said base panel, and being formed as diverging angular surfaces proceeding outward from adjacent said respective elongated grooves;

an insert strip in the form of an elongated panel having a plurality of spaced holes formed therealong and including ridge means on each side for mating engagement in the respective base member grooves; and

a light strip having plural lamp assemblies mounted thereon in spacing similar to said insert strip spaced holes, said light strip being disposed between the insert strip and mounting member base panel and extending respective lamp assemblies through said spaced holes.

4,884,179

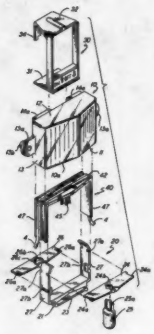
LAMP WITH BUILT-IN ON-OFF SWITCH

Dennis G. Moore, 2602 Superior, Livermore, Calif. 94550

Filed Jun. 14, 1988, Ser. No. 206,283

Int. Cl.[4] F21V *23/00*

U.S. Cl. 362—295 17 Claims



1. An electric lamp for use in a vehicle lighting system comprising

a housing having a light transmitting portion through which light is passed when a light bulb positioned therein is illuminated,

said housing having an opening for receiving therethrough a light bulb carrier means for supporting a light bulb in a predetermined position when said light bulb carrier means is positioned therein,

a light bulb carrier means for retaining a light bulb in a position such that an electrical coupling portion of the light bulb extends outwardly from said light bulb carrier means for engagement with an electrical contact means to couple therethrough a source of illuminating energy for the light bulb,

electrical contact means supported in said housing in a position to be engaged by the electrical coupling portion of a light bulb retained in said light bulb carrier means such that movement of said light bulb carrier means positions the light bulb retained therein in to and out from engagement with said electrical contact means to thereby illuminate and extinguish the light bulb, and

actuator slide means carried by said housing and movable relative thereto for effecting the opening and closing of an illuminating circuit for illuminating a light bulb positioned in said light bulb carrier means,

said actuator slide means positioned by said housing to engage said light bulb carrier means for effecting movement thereof in response to movement of said actuator slide means to thereby move a light bulb retained in said light bulb carrier means in to and out from engagement with said electrical contact means for selectively coupling the light bulb to a source of electric power.

4,884,180

REGULATED DIRECT-CURRENT CONVERTER

Günther Hoffmann, Eningen, Fed. Rep. of Germany, assignor to Wandel & Goltermann GmbH & Co., Eningen, Fed. Rep. of Germany

Filed Nov. 18, 1988, Ser. No. 273,965

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1987, 3741452

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—21 23 Claims

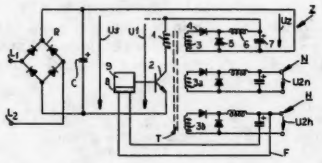
1. A direct-current converter for producing an output voltage from a feed voltage, comprising:

a converter transformer having a primary winding and at least one secondary winding;

a pulse-width control circuit connected in series with said primary winding;

a main-voltage rectifier circuit connected with said secondary winding for outputting a main output voltage;

means for controlling said pulse-width control circuit in response to said main output voltage;



an additional-voltage rectifier circuit connected to output an additional voltage and generating said additional voltage by a rectification similar to that producing said main output voltage; and

means for applying a feed voltage and said additional voltage additively to said primary winding.

4,884,181

METHOD AND ARRANGEMENT FOR CONTROLLING A HIGH VOLTAGE D-C TRANSMISSION SYSTEM

Wolfgang Kaufhold, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 230,894

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1987, 3728512

Int. Cl.[4] H02J *3/36*

U.S. Cl. 363—35 4 Claims

1. A method of controlling a high-voltage d-c transmission system between three-phase network-fed rectifier and inverter stations, comprising the steps of:

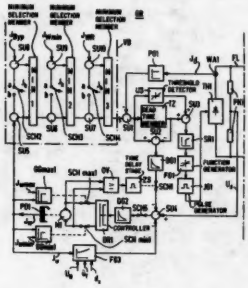
forming a first reference d-c current from the difference of a reference current-dependent control angle function and a current controller dependent control angle on a rectifier side of the system, wherein the current controller is influenced by a difference of the first reference d-c current and an actual d-c current;

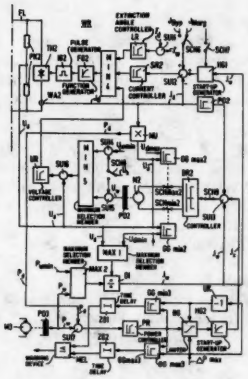
setting a countervoltage as a function of the power on an inverter side of the system to thereby determine the actual d-c current;

producing a second reference d-c current from division of a reference power by actual d-c voltage;

producing on the inverter side a difference of the actual d-c

current and the second reference d-c current to influence a level controller; and





setting the second reference d-c current for a voltage controller on the inverter side via the level controller.

4,884,182

CURRENT SOURCE POWER CONVERTING APPARATUS WITH OVERVOLTAGE PROTECTION

Takeki Ando, Naka; Kiyoshi Nakamura, Katsuta; Toshisuke Mine, Katsuta; Hiromi Inaba, Katsuta; Toshiaki Kurosawa, Katsuta; Masao Nakazato, Katsuta, and Yoshio Sakai, Naka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 184,048

Claims priority, application Japan, Apr. 22, 1987, 62-97359

Int. Cl.[4] H02H *7/10*

U.S. Cl. 363—37 **12 Claims**

1. A current source power converting apparatus comprising:

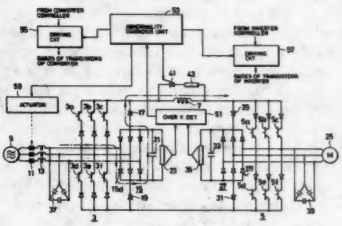
converter means, fed by an AC power source through a contactor, for converting AC power into DC power;

DC reactor means coupled in series with one of the DC terminals of said converter means;

inverter means, fed by said converter means through said DC reactor means, for inverting the DC power into AC power to be supplied for an AC load,

first energy absorbing means including a first rectifier having AC terminals coupled to AC terminals of said converter means and having DC terminals coupled between said DC reactor means and said converter means and in parallel with DC terminals of said converter means through diodes, and a first capacitor connected in parallel with the DC terminals of the first rectifier; and

second energy absorbing means including a second rectifier having AC terminals coupled to AC terminals of said inverter means and having DC terminals coupled between said DC reactor means and said inverter means through diodes, and a second capacitor connected in parallel with the DC terminals of the second rectifier;



whereby said first and second energy absorbing means and said DC reactor means form a circulation circuit through which current caused by energy stored in said DC reactor means can be circulated when voltage induced by said DC reactor means is higher than a first predetermined value.

4,884,183

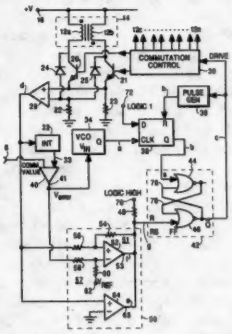
DUAL-MODE CONTROLLED PULSE WIDTH MODULATOR

Daniel M. Sable, Blacksburg, Va., assignor to General Electric Company, East Windsor, N.J.

Filed Mar. 29, 1989, Ser. No. 330,388

Int. Cl.[4] H02M *3/156*

U.S. Cl. 363—41 **4 Claims**



1. A power switch drive circuit for causing the average current through an inductor to tend to follow a command signal, comprising:

a controllable power switch including a control input terminal;

an inductor serially coupled with said controllable power switch to form a series circuit, said series circuit being adapted to be coupled across the terminals of a source of voltage for causing an increasing ramp-like current to flow when said switch is conductive;

current sensing means coupled to said series circuit for generating a current-representative signal;

integrating means coupled to said current sensing means for generating a signal representative of the average of said current representative signal;

first comparator means coupled to said integrating means and adapted to receive said command signal for compar-

ing said command signal with said signal representative of the average of said current-representative signal for generating an error signal therefrom;

a voltage-controlled oscillator coupled to said first comparator for generating oscillations at a frequency controlled by the magnitude of said error signal;

a D flip-flop including a data input terminal coupled to a source of signal representative of a first logic level and also including a clock input terminal coupled to said voltage-controlled oscillator, and also including an output terminal, for, when said D flip-flop is in a reset state, gating said first logic level to said output terminal of said D flip-flop in response to a transition of said oscillations, said D flip-flop further including a Reset input terminal;

an RS flip-flop including a set input terminal coupled to said output terminal of said D flip-flop, said RS flip-flop further including a Reset input terminal, and also including an output terminal coupled to said control input terminal of said power switch for driving said switch during those intervals in which said RS flip-flop is in a reset state;

a pull-up resistor coupled to said Reset input terminal of said RS flip-flop and to a source of signal representative of said first logic level;

second comparator means coupled to said current sensing means and to a source of reference signal representative of a minimum current condition, and also including an output terminal coupled to said Reset input terminal of said RS flip-flop, for assuming a second logic level at said output terminal of said second comparator means in response to a zero value of said current-representative signal, and for assuming a high impedance condition at said output terminal of said second comparator means in response to a nonzero value of said current-representative signal;

hysteresis means including a first input terminal coupled to said first comparator means, a second input terminal coupled to said current sensing means, and an output terminal capable of assuming said second logic state and an open-circuit state, said output terminal being coupled to said Reset input terminal of said RS flip-flop, for switching said output terminal to said open-circuit state when said current-representative signal reaches a predetermined amount above said signal representative of the average of said current-representative signal, and for switching said output terminal to said second logic level under one of the conditions that (a) said current-representative signal reaches a predetermined value less than said signal representative of the average of said current representative signal, and (b) said output terminal of said second comparator means assumes said second logic level; and

pulse generating means coupled to said output terminal of said RS flip-flop for generating a pulse in response to a transition of a particular polarity at said output terminal of said RS flip-flop, and coupled to said Reset input terminal of said D flip-flop for coupling said pulse as a reset pulse to said D flip-flop in response to each said transition of a particular polarity.

4,884,184

CONTROL APPARATUS FOR CASCADED CONVERTER CIRCUIT

Takayuki Matsui, Hitachi; Toshiaki Okuyama, Ibaraki; Mitsugu Matsutake, Hitachi; Junichi Takahashi, Katsuta, and Masami Ito, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 3, 1988, Ser. No. 151,902

Claims priority, application Japan, Feb. 6, 1987, 62-24561

Int. Cl.[4] H02M *1/14*

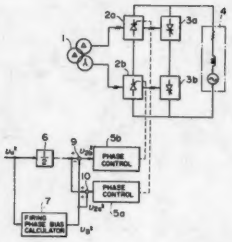
U.S. Cl. 363—46 **14 Claims**

1. A converter circuit control apparatus, comprising:

a cascaded converter circuit composed of at least two unit converters connected in cascade;

a load supplied with electric power from said cascaded converter circuit;

phase control means each provided in association with each of said unit converters for controlling firing phase of the associated unit converter in accordance with a voltage command signal; and



firing phase adjusting means for adjusting the firing phases controlled by said phase control means so that phases of ripple components in the output voltages of said unit converters are maintained at a predetermined angular difference.

4,884,185

PULSE WIDTH MODULATION CONVERTER

Cornilleau Hubert, Saint Germain En Laye, France, assignor to La Telemecanique Electrique, France

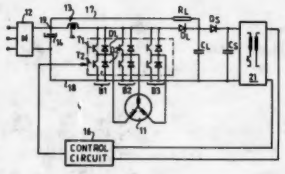
PCT No. PCT/FR88/00156, § 371 Date Nov. 29, 1988, § 102(e) Date Nov. 29, 1988, PCT Pub. No. WO88/07784, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 25, 1988, Ser. No. 287,200

Claims priority, application France, Mar. 30, 1987, 87 04371

Int. Cl.[4] H02M *5/44*

U.S. Cl. 363—56 **4 Claims**



1. A pulse width modulation converter for delivering variable electric energy to an inductive load, said converter including:

(i) a DC voltage source;

(ii) an inverter having a plurality of arms connected in parallel across first and second leads each having input and output terminals, each of said arms including first and second static switches seriallyconnected across said leads and first and second recovery diodes respectively connected across said first and second switches, the second switch of each arm having a common point which is connected to the inductive load;

(iii) a control circuit connected to said inverter for driving said inverter in pulse with modulation;

(iv) an inductance connecting said DC voltage source to the input terminal of said first lead;

(v) a serial circuit comprising a transfer capacitor (C_L) in series with a transfer diode (D_L) connecting the output terminal of said first lead to the output terminal of the second lead;

(vi) a transfer capacitor discharge resistor connecting the

DC voltage source to the common point between said diode and said transfer capacitor, and

(vi) means connecting said DC voltage source to the input terminal of said lead.

4,884,186

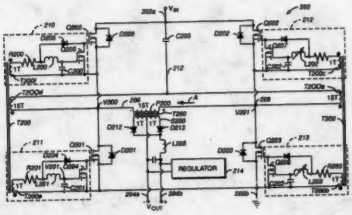
POWER SUPPLY WITH REDUCED SWITCHING LOSSES

Kenneth T. Small, Cupertino, Calif., assignor to Boschert Incorporated, Fremont, Calif.

Filed Dec. 10, 1987, Ser. No. 130,906

Int. Cl.[4] H02M *7/5387*

U.S. Cl. 363—132 **18 Claims**



1. A full-bridge converter comprising:

a first lead for receiving a first voltage;

a second lead for receiving a second voltage;

first transistor means having a first current carrying lead coupled to said first lead and a second current carrying lead coupled to a first node, said first transistor means having a control lead;

second transistor means having a first current carrying lead coupled to said first node and a second current carrying lead coupled to said second lead, said second transistor means having a control lead;

third transistor means having a first current carrying lead coupled to said first lead and a second current carrying lead coupled to a second node, said third transistor means having a control lead;

fourth transistor means having a first current carrying lead coupled to said second node and a second current carrying lead coupled to said second lead, said fourth transistor means having a control lead; and

a transformer having at least first, second and third legs, said transformer including a primary winding coupled between said first and second nodes and a secondary winding coupled to provide output power in response to the voltage applied across said primary winding, a first control winding coupled to the control lead of said first transistor means for controlling said first transistor means, a second control winding coupled to said control lead of said second transistor means for controlling said second transistor means, a third control winding coupled to said control lead of said third transistor means for controlling said third transistor means, and a fourth control winding coupled to said control lead of said fourth transistor means for controlling said fourth transistor means, and wherein said primary and secondary windings are wound around said first leg, said first and second control windings are wound around said second leg, and said third and fourth windings are wound around said third leg.

5. The converter of claim 1 further comprising an auxiliary output winding wound around said second leg for providing a second output voltage.

4,884,187

VOLTAGE REGULATOR WITH FERROMAGNETIC FILTER

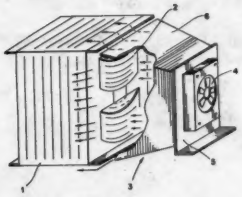
Maurice Budin, Bron, and Pierre Veyrand, Saint Priest, both of France, assignors to Automatismes Energie Electronique Systemes, France

Filed Dec. 5, 1988, Ser. No. 280,002

Claims priority, application France, Dec. 8, 1987, 87 17369

Int. Cl.[4] G05F *1/13*

U.S. Cl. 363—141 **3 Claims**



1. A ferromagnetic voltage regulator of the type having ferro-resonant saturating magnetic circuits comprising:

a ferromagnetic circuit member;

at least one electromagnetic winding disposed in operative relationship with said circuit member;

forced thermal heat extraction means;

fluid directing means operatively coupling said heat extraction means first to said electromagnetic winding and then to said ferromagnetic circuit member to remove from the regulator the thermal losses of the winding and circuit members and increase the joules losses to iron losses ratio.

4,884,188

MAGNETIC ROLLER MEANS WITH STATIONARY MAGNETIC KNIFE BLADE FOR USE IN PRINTING DEVICES

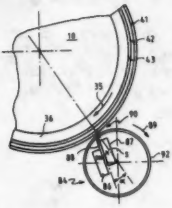
Ronald Berkhout, Venlo; Johannes G. V. Van Stiphout, Maasbree; Jozef Corver, Nuenen; Antoon L. Hoep, Molenhoek, and Berend J. Knapen, Baarlo, all of Netherlands, assignors to Oce-Nederland B.V., Venlo, Netherlands

Filed Aug. 23, 1988, Ser. No. 235,428

Claims priority, application Netherlands, Aug. 25, 1987, 8701985; May 20, 1988, 8801309

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—160.1 **7 Claims**



1. A printing device for reproducing information, comprising a movable image-forming element with a dielectric surface; an image-forming station including a magnetic roller having a rotatable electrically conductive non-magnetic sleeve disposed near the surface of said image-forming element; means to generate an electric field between the image-forming element and said magnetic roller in accordance with an information pattern; means for placing an electrically conductive magnetically

attractable toner powder in the between said magnetic roller and said image-forming element; and means for generating a magnetic field in said zone comprising a stationary ferromagnetic knife blade disposed within said sleeve of said magnetic roller, said blade being held in place at an angle of between 70° and 85° to a tangential plane of said sleeve by two magnets.

4,884,189

LOCUS INTERPOLATION DEVICE

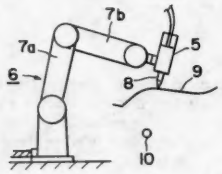
Kaoru Kimura; Masanori Nishi, both of Kitakyushu, and Yoshikatsu Minami, Nakama, all of Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Kitakyushu, Fukuoka, Japan

Filed Sep. 25, 1987, Ser. No. 100,863

Claims priority, application Japan, Oct. 6, 1986, 61-237517; Aug. 28, 1987, 62-214896

Int. Cl.[4] G05B *19/18*; G06F *15/46*

U.S. Cl. 364—474.31 **7 Claims**



1. A locus interpolation device provided at the end of a movable member, said device comprising an operational shaft having an end provided with tool-supporting means, said operational shaft being rotatable about a first rotating center which is eccentric with respect to a tool mounted thereon, a rotating shaft for supporting and rotating said operational shaft, said rotating shaft being rotatable about a second rotating center which is spaced apart from the first rotating center by a predetermined distance, said operational shaft being rotated such that a radial distance between the tool and said second rotating center is made equal to a radius of circular movement of said tool to control the operation of said tool independently from the movement of said movable member in a manner interpolating the locus of circular and noncircular configuration.

4,884,190

HIGH PERFORMANCE PARALLEL VECTOR PROCESSOR HAVING A MODIFIED VECTOR REGISTER/ELEMENT PROCESSOR CONFIGURATION

Chuck H. Ngai, Endwell, and Gerald J. Watkins, Endicott, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Continuation of Ser. No. 711,329, Mar. 13, 1985, abandoned, and a continuation-in-part of Ser. No. 530,842, Sep. 9, 1983. This application Mar. 8, 1989, Ser. No. 320,889

Int. Cl.[4] G06F *9/18*

U.S. Cl. 364—200 **7 Claims**

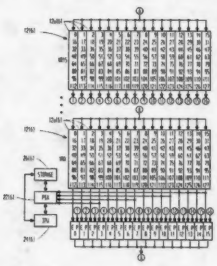
1. A vector processor, comprising:

a plurality of vector registers, wherein each vector register is subdivided into a plurality of smaller registers, each of said smaller registers having a separate output, and

each vector register stores a vector, each of said smaller registers storing a plurality of elements of said vector, each vector including a plurality of groups of said elements, each group including a plurality of elements corresponding in number to the plurality of smaller registers, the plurality of elements of each group of a vector stored in a vector register being stored, respectively, in the plurality of smaller registers of the vector register;

a plurality of element processor means connected, respectively, to the plurality of outputs of the corresponding plurality of smaller registers of each of said plurality of vector registers, each of said element processor means being dedicated and connected to a different set of said smaller registers to process any element within the dedicated set, each of said sets comprising one smaller register per vector register, and wherein all the smaller registers in each set store corresponding vector elements of said vectors, each of said element processor means processing, one element at a time, the elements stored in any smaller register of the dedicated set; and

controlling means for selecting which groups of elements in



the associated vector registers to process, whereby the plurality of element processor means process, at least partially in parallel, the plurality of elements of each selected group, and wherein

each of said smaller registers of each vector register stores vector elements whose positions in the vector are defined by the equation $K_1+N_I\times K_2$ where K_1 is a constant which is different for each smaller register within the same vector register, K_2 is a constant which is the same for each smaller register within the same vector register and N_I is a sequence of integers.

4,884,191

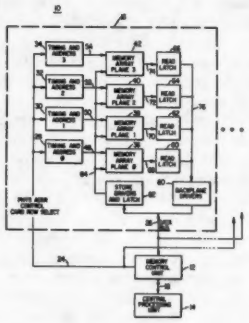
MEMORY ARRAY UNIT FOR COMPUTER

James R. Weatherford, Lake Dallas, and Arthur T. Kimmel, Dallas, both of Tex., assignors to Convex Computer Corporation, Richardson, Tex.

Continuation of Ser. No. 18,752, Feb. 24, 1987, abandoned, which is a continuation of Ser. No. 622,457, Jun. 20, 1984, abandoned. This application Mar. 24, 1989, Ser. No. 328,798

Int. Cl.[4] G06F *13/00, 12/00*; G11C *13/00*

U.S. Cl. 364—200 **4 Claims**



1. A memory array unit for use in a computer which has a central processing unit that operates in conjunction with a memory control unit, comprising:

a plurality of memory array planes each including a plurality of integrated circuit memory devices for storing data therein, each said memory array plane having an input for receiving data for storage in said memory devices and an output for supplying data read from said memory devices,

a respective address and control circuit for each of said memory array planes, each address and control circuit connected to receive address information and control commands from said memory control unit and connected to provide address information and control commands to the corresponding one of said memory array planes,

a store latch having an input and an output,

a bidirectional data bus connected between said memory control unit and the input of said store latch, wherein said store latch only receives data from said memory control unit,

a unidirectional input bus connected between the output of said store latch and the inputs of said memory array planes, wherein said unidirectional input bus transfers data only from said store latch to the inputs of said memory array planes,

a respective read latch for each of said memory array planes, each read latch having an input and an output, the input for each read latch connected to the output of the corresponding one of said memory array planes,

a driver circuit having an input and an output, the output of said driver circuit connected to said bidirectional bus for transferring data only from said driver circuit to said memory control unit, and

a unidirectional output bus connected between the outputs of said read latches and the input of said driver circuit for transferring data only from said read latches to said driver circuit.

4,884,192

INFORMATION PROCESSOR CAPABLE OF DATA TRANSFER AMONG PLURAL DIGITAL DATA PROCESSING UNITS BY USING AN ACTIVE TRANSMISSION LINE HAVING LOCALLY CONTROLLED STORAGE OF DATA

Hiroaki Terada, Suita; Katsuhiko Asada, Amagasaki; Hiroaki Nishikawa, Suita; Souichi Miyata, Shiki; Hajime Asano, Toyonaka; Masahisa Shimizu, Kadoma; Kenji Shima, Nishinomiya, and Shinji Komori, Itami, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka; Matsushita Electric Industrial Co., Ltd., Kadoma; Sanyo Electric Co., Ltd., Moriguchi and Mitsubishi Denki Kabushiki Kaisha, Tokyo, all of, Japan

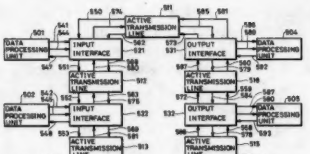
Continuation of Ser. No. 765,504, Aug. 14, 1985, abandoned.

This application Dec. 14, 1987, Ser. No. 134,601

Claims priority, application Japan, Aug. 16, 1984, 59-171121; Aug. 16, 1984, 59-171203

Int. Cl.[4] G06F *13/40*

U.S. Cl. 364—200 **4 Claims**



1. An information processor for receiving input data, for outputting output data, and capable of data transfer among a plurality of digital data processing units, comprising:

at least one receiving and controlling means for receiving and controlling the input data;

at least one transmitting and controlling means for controlling and transmitting the output data;

at least one data processing means, for processing the input data received by said at least one receiving and controlling means and for providing the output data for transmission by said at least one transmitting and controlling means;

an active transmission line including:

a plurality of data holding means for storing and outputting data, including the input data and the output data, in inputted order, said plural data holding means coupled together in a ring; and

transmission control means, coupled to said plurality of data holding means, for controlling the output of the data stored in said plural data holding means, so that when a latter one of said data holding means is empty, data stored in a preceding one of said data holding means is read out and applied to the latter one of said data holding means, said transmission control means including a plurality of transmission controlling means, respectively coupled to said plurality of data holding means, each of said plurality of transmission controlling means for controlling the output of data stored in the corresponding one of said plural data holding means so as to control the transfer of the data stored in the corresponding one of said plural data holding means to an adjacent one of said plural data holding means through use of a hand-shake procedure in which a preceding one of said transmission controlling means corresponding to a preceding one of said data holding means which is holding data, provides a first signal to a latter one of said transmission controlling means corresponding to a latter one of said data holding means, the first signal indicating that the data held by the preceding one of said data holding means is to be transmitted to the latter one of said data holding means, the latter one of said transmission controlling means returning a second signal indicating that the latter one of said data holding means is empty, the preceding one of said transmission controlling means being responsive to the second signal for transmitting the data stored in the preceding one of said data holding means to the latter one of said data holding means and providing a third signal indicating that the preceding one of said data holding means is empty;

a plurality of data jointing means, coupled between respective predetermined ones of said data holding means in said active transmission line and respectively coupled to said at least one receiving and controlling means and said at least one data processing means, for jointing said at least one receiving and controlling means and said at least one data processing means, respectively, to said active transmission line, a first of said plurality of data jointing means having an input terminal, coupled to said at least one receiving and controlling means, for jointing the input data from said at least one receiving and controlling means to said active transmission line, a second of said plurality of data jointing means including an input terminal, coupled to said at least one data processing means, for jointing the output data from said at least one data processing means to said active transmission line;

a plurality of data branching means, coupled between respective predetermined ones of said plurality of data holding means in said active transmission line, and respectively coupled to said at least one transmitting and controlling means and said at least one data processing means, for branching the data transmitted on said active transmission line to said at least one transmitting and controlling means and said at least one data processing means, respectively, a first of said plurality of data branching means having an output terminal for branching the output data from said active transmission line to said at least one transmitting and controlling means, a

second one of said plurality of data branching means having an output terminal for branching the input data from said active transmission line to said at least one data processing means.

4,884,193

WAVEFRONT ARRAY PROCESSOR

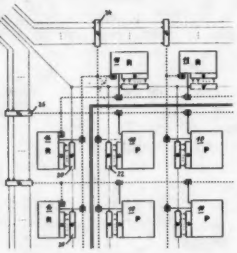
Hans-Werner Lang, Hansa-Strasse 48, 2300 Kiel, Fed. Rep. of Germany

Filed Sep. 18, 1986, Ser. No. 908,580

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1985, 3533800

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **2 Claims**



1. A method for operating a highly integrated wavefront array processor having n×m processor cells arranged in n horizontal rows and m vertical columns with each processor cell connected to each of its horizontally and vertically adjacent processor cells, comprising the steps of shifting an instruction code in horizontal and vertical directions between adjacent processor cells from one processor cell to the respective next horizontally and vertically adjacent processor cell, and shifting a first group of n row selection bits and a second group of m column selection bits through the processor cell array to release certain processor cells for the execution of said instructions.

4,884,194

MULTIPROCESSOR COMPUTER SYSTEM WHICH INCLUDES N PARALLEL-OPERATING MODULES AND AN EXTERNAL APPARATUS, AND COMPUTER MODULE FOR USE IN SUCH A SYSTEM

Thijs Krol, and Willibrordus J. Van Gils, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 136,432, Dec. 17, 1987, abandoned, which is a continuation of Ser. No. 758,932, Jul. 25, 1985, abandoned. This application Jan. 30, 1989, Ser. No. 304,892

Claims priority, application Netherlands, Aug. 10, 1984, 8402472

Int. Cl.[4] G06F *15/16*

U.S. Cl. 364—200 **16 Claims**

1. A multiprocessor computer system which includes a plurality of n parallel-operating computer modules, each of which is situated in its own fault isolation area, said computer system having a failure protection means for maintaining operability under failure of at most $1 \leqq t < n$ of said computer modules, wherein each of said n parallel-operating computer modules includes:

a processor for processing data words, each of said data words consisting of a plurality of $k \geqq t+1$ data symbols;

a reducing encoder module connected to said processor module for encoding a received data word into one code symbol;

a storage module connected to said reducing encoder module for storing a code symbol and having a data output; and

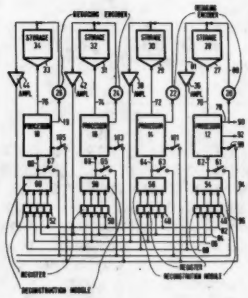
a data word reconstruction module connected to said data outputs and to each of said n parallel-operating computer modules to receive a full code word of $n \geqq k+2t$ code symbols of a code having a correction capability of t symbols per code word and to reconstruct from said full code word an associated data word;

and wherein $1 \leqq A \leqq n$ of said computer modules has a connection for receiving a primary version of an external message, wherein said computer system comprises:

broadcasting means for executing a first sequence of $(t+1)$ broadcasting steps; and

decision means in each computer module responsive to said broadcasting steps for executing, after completion of said first sequence, a second sequence of $(t+1)$ decision steps, wherein said first sequence has the following steps:

a first broadcasting step in which each of said computer modules that receives a primary version of said external message broadcasts a secondary version of said external message to all the other of said computer modules; and



a second broadcasting step in which each of said computer modules that receives a secondary version of said external message broadcasts a tertiary version of said external message to each other of said computer modules that had not directly received the primary version of said external message from which said secondary version was derived, whereby each computer module receiving a secondary version and not a primary version also receives a plurality of tertiary versions; and

wherein said second sequence in each computer module has the following steps:

a penultimate decision step responsive to said second broadcasting step for executing a plurality of majority decisions, each decision being made on said secondary version and said plurality of tertiary versions that originate from the same primary version of the external message to yield a plurality of penultimate decision results; and

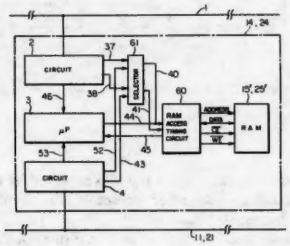
an ultimate decision step in each of said computer modules which had received a primary version of said external message, for executing a selection decision among said penultimate decision results and said primary versions of said external message.

4,884,195

MULTIPROCESSOR SYSTEM FOR LOADING MICROPROGRAMS INTO A RAM CONTROL STORE OF A BUS CONTROLLER

Norikazu Endo, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 11, 1986, Ser. No. 895,438
Claims priority, application Japan, Aug. 30, 1985, 60-189565
Int. Cl.[4] G06F 9/06, 9/24, 13/10, 13/14
U.S. Cl. 364—200 2 Claims



1. A multiprocessor system including:

at least two modules wherein each module includes,

(a) a first processor for executing arithmetic processing and peripheral control,

(b) a first memory for storing program and data wherein said program and data controls said first processor,

(c) an input-output controller controlled by said first processor wherein said input-output controller controls external input-output devices,

(d) a transmission controller controlled by said first processor wherein said transmission controller controls information transfers from/to another module, and

(e) a first common transmission path connected to said first processor, said first memory, said input-output controller and said transmission controller for permitting information transfers between said first processor, said first memory, said input-output controller and said transmission controller; and

a second common transmission path respectively connected to transmission controllers of said modules for permitting information transfers between said modules via said transmission controllers,

said transmission controller includes

a second processor for executing arithmetic processing,

a second memory for storing microgprogram wherein said microprogram controls said second processor, said second memory being writable,

a first circuit connected to said first common transmission path and said second memory, said first circuit being controlled, in an initial state following a power-on sequence, by said first processor such that microprogram, transferred through said first transmission path, is stored in said second memory,

a second circuit connected to said second common transmission path and said second memory, said second circuit stores microprogram, transferred through said second transmission path subsequent to recognizing an identification code of an associated module, in said second memory during a power-on sequence, and

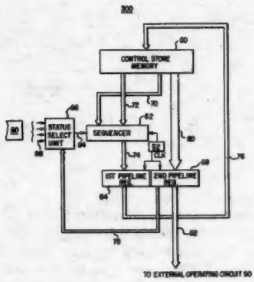
means connected to said first circuit, said second circuit and said second memory for sending said microprogram obtained from either said first circuit or said second circuit to said second memory.

4,884,196

SYSTEM FOR PROVIDING DATA FOR AN EXTERNAL CIRCUIT AND RELATED METHOD

Geoffrey L. Thiel, Richmond; Douglas H. Hodgkiss, Sheppston, both of United Kingdom, and Hisanori Tohara, Otawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Oct. 6, 1986, Ser. No. 915,062
Claims priority, application Japan, Oct. 7, 1985, 60-221758
Int. Cl.[4] G06F 15/16, 9/24
U.S. Cl. 364—200 11 Claims



1. A system for sequentially providing external circuit data to an external circuit, comprising:

a memory having a plurality of memory locations identified by addresses, each said memory location containing an instruction comprising external circuit data and memory location data, said memory further comprising an address input terminal for currently accessing one of said memory locations in response to receipt of the address for that memory location at said address input terminal;

sequencer means, coupled to said memory, for receiving said memory location data from said currently accessed one of said memory locations, and for selecting the address of another one of said memory locations in response to said memory location data subsequent to receipt of said memory location data from said currently addressed one of said memory locations;

first register means, coupled between said sequencer means and said address input terminal of said memory, for receiving said selected address of said another one of said memory locations from said sequencer means, and for storing said selected address to make said selected address available at said address input terminal of said memory to access said another one of said memory locations; and

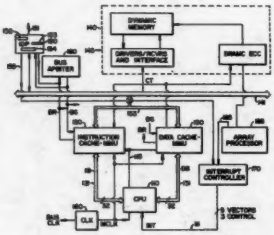
second register means, coupled between said memory and said external circuit, for receiving said external circuit data from said currently accessed one of said memory locations concurrently with receipt of said memory location data from said currently accessed one of said memory locations by said sequencer means and for storing said external circuit data of said currently accessed memory location in said second register means, for use, after said storing, be said external circuit.

4,884,197

METHOD AND APPARATUS FOR ADDRESSING A CACHE MEMORY

Howard G. Sachs; James Y. Cho, both of Los Gatos, and Walter H. Hollingsworth, Campbell, all of Calif., assignors to Intergraph Corporation, Huntsville, Ala.

Continuation of Ser. No. 704,499, Feb. 22, 1985. This application Oct. 3, 1986, Ser. No. 915,319
Int. Cl.[4] G06F *9/00, 9/38*
U.S. Cl. 364—200 16 Claims



1. A microprocessor comprising:
a first addressable memory forming a data cache;
a second addressable memory forming an instruction cache, the instruction cache being separate from the data cache;
execution means for processing data received from the data cache in response to an instruction from the instruction cache;
data interface means, coupled to the data cache and to the execution means, for independently controlling access to the data cache and for communicating data from the data cache to the execution means; and
instruction interface means, coupled to the instruction cache and to the execution means, for independently controlling access to the instruction cache and for communicating instructions from the instruction cache to the execution means, the instruction interface means including:
a counter for addressing the instruction cache;
instruction address loading means, coupled to the counter, for storing a first address in the counter; and
cache advance means for repetitively generating a non-address cache advance signal for incrementing the counter after the first address is stored in the counter, the counter being incremented once per cache advance signal, and the cache advance means operating independently of the instruction address loading means.

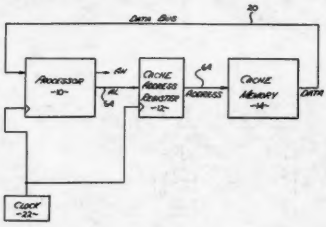
4,884,198

SINGLE CYCLE PROCESSOR/CACHE INTERFACE

Robert B. Garner, San Jose, and Anant Agrawal, Cupertino, both of Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.

Filed Dec. 18, 1986, Ser. No. 944,422
Int. Cl.[4] G06F *13/00, 9/16*
U.S. Cl. 364—200 12 Claims

1. A cache access system external to a processor comprising:
cache memory means including a cache memory for storing data at a plurality of addresses;
cache register means coupled to said cache memory means for temporarily storing an address to be applied to said cache memory on receipt of a clock signal by said cache register means;
address generation means coupled to said cache register means for generating said address and providing said address to said cache register means;
clock means for generating cyclical clock signals coupled to said cache register means and said dddress generation means;
cache data receiving means, internal to the processor, coupled to said cache memory means and said clock means for receiving said accessed data on receipt of said clock signal;
wherein said cache register means has a first inherent delay of said clock signal and said cache data receiving means has a second inherent delay of said clock signal which is longer than said first inherent delay a fraction of a clock



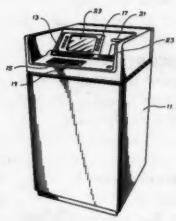
cycle, such that said clock signal is received by said cache data receiving means after receipt of said clock signal by said cache register means;
whereby said fraction of a clock cycle provides additional time for accessing said cache memory means prior to the receipt of said clock signals by said cache data receiving means.

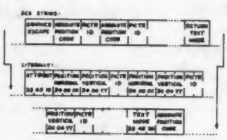
4,884,199

USER TRANSACTION GUIDANCE

William A. Boothroyd, Davidson, N.C.; James C. Camann, Fort Mill, S.C., and Robert A. Palo, Concord, N.C., assignors to International Business Macines Corporation, Armonk, N.Y.

Filed Mar. 2, 1987, Ser. No. 20,796
Int. Cl.[4] G06F *15/30*
U.S. Cl. 364—408 9 Claims





1. A computer comprising:
a display buffer and a display screen for displaying to a user on said display screen information stored in said display buffer;
a processor for receiving a picture library, and a message specification string;
means in said processor for recognizing a graphic control code in said message specification string as an instruction to interpret the following field as a picture ID code;
means in said processor for recognizing said picture ID code

as an instruction to retrieve from said picture library, records containing information representing a picture, said records each having a skip field, a length field, and a data field;

means in said processor for processing a count in said skip field to determine where on said display screen said picture is to be displayed.

4,884,200

SIGNAL DETECTING METHOD IN AUTORADIOGRAPHY

Tsutomu Kimura, and Kazuhiro Hishinuma, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

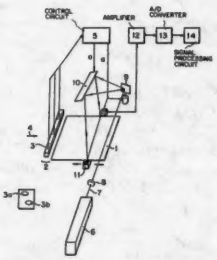
Filed Mar. 30, 1984, Ser. No. 595,504

Claims priority, application Japan, Mar. 31, 1983, 58-57418

The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.

Int. Cl.[4] G03B *41/16*; G01N *33/50*, *27/26*; G01T *1/29*

U.S. Cl. 364—413.13 **7 Claims**



1. A signal detecting method in autoradiography, which is applied to an autoradiograph having locational information on radioactively labeled substances distributed one-dimensionally, being recorded on a radiosensitive material as a visible image, which comprises steps of:

(1) scanning the radiosensitive material with a light in at least two different positions in such a manner that each scanning traverses the one-dimensional distribution of the radioactively labeled substances and photoelectrically reading out a portion of the visualized autoradiograph to give an electric signal, to which is applied a signal processing comprising stages of:

detecting distribution points of the radioactively labeled substances for each scanning, and preparing a continuous line selected from the group consisting of a straight line, a polygonal line and a curved line along the corresponding distribution points of the radioactively labeled substances for each scanning, to assign said continuous line to one-dimensional distribution direction of the radioactively labeled substances; and

(2) scanning the radiosensitive material with a light along said one-dimensional distribution direction of the radioactively labeled substances determined in the step (1) and photoelectrically reading out the visualized autoradiograph, to obtain the locational information on the radioactively labeled substances indicated by said autoradiograph as a digital signal.

4,884,201

AUTOMATIC GEAR CHANGE DEVICE

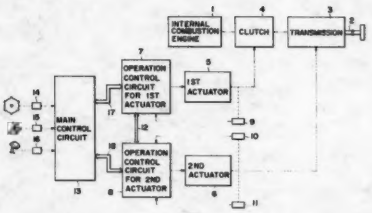
Yuji Sato; Hiromi Kono; Akifumi Tanoue, and Yoshiyuki Kimura, all of Higashi-matsuyama, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Jun. 13, 1988, Ser. No. 206,865

Claims priority, application Japan, Jun. 12, 1987, 62-146725

Int. Cl.[4] B60K *41/18*; G05B *9/02*

U.S. Cl. 364—424.1 **5 Claims**



1. An automatic gear change device for controlling the operation of a gear transmission and a clutch, said clutch for engaging and disengaging said gear transmission, said device comprising:

a first actuator connected to said clutch, said first actuator operating said clutch in response to a first actuator signal;

a second actuator connected to said gear transmission, said second actuator operating said gear transmission in response to a second actuator signal;

a first actuator operation control means, connected to said first actuator, for outputting said first actuator signal in response to target data;

a second actuator operation control means, connected to said second actuator, for outputting said second actuator signal in response to said target data;

a main control means, connected to said first actuator operation control means by a first signal path and connected to said second operation control means by a second signal path, for outputting said target data;

a communication means for electrically interconnecting said first actuator operation control means and said second actuator operation control means;

a first stroke sensor connected to said first actuator and said first actuator operation control means, said first stroke sensor outputting to said first actuator operation control means a first position signal in accordance with a stroke of said first actuator; and,

a second stroke sensor connected to said second actuator and said second actuator operation control means, said second stroke sensor outputting to said second actuator operation control means a second position signal in accordance with a stroke of said second actuator;

wherein a first electrical signal path is established between said main control means and said first actuator operation control means through said second signal path and said second actuator operation control means and said communication means when said first signal path is inoperative;

wherein a second electrical signal path is established between said main control means and said second actuator operation control means through said first signal path and said first actuator operation control means and said communication means when said second signal path is inoperative; and,

wherein said first and second actuator operation control means respectively output first and second position data to said main control means, said first and second position data respectively corresponding to said first and second position signals.

4,884,202

PROGRAMMABLE DRIVERLESS VEHICLE

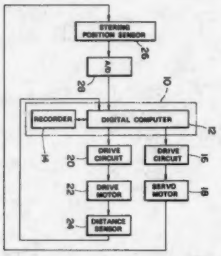
Hiroshi Ogawa, Aichi, and Susumu Yoshida, Kagamihara, both of Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Feb. 2, 1987, Ser. No. 9,958

Claims priority, application Japan, Feb. 4, 1986, 61-22387; Feb. 4, 1986, 61-22388

Int. Cl.[4] G06F *15/50*

U.S. Cl. 364—424.01 9 Claims



1. A programmable driverless vehicle comprising:

a first signal source for producing a first electrical signal having an actual value for a steering position of the driverless vehicle;

a second signal source for producing a second electrical signal having a value for a distance from its initial position covered by the driverless vehicle;

a data recorder having a record of information programmed therein, the information defining target steering positions as a function of the covered distance;

a control circuit responsive to the second signal for calculating a target value for the steering position from the information programmed in the data recorder, the control circuit including means for calculating an error between the actual and target values for the steering position, the control circuit including means for storing a predetermined number of steering position errors calculated successively to have the most recent successive steering position errors, the control circuit including means for calculating a duty ratio as a function of the new steering position error, the control circuit including means for setting the duty ratio at a predetermined maximum value when the new and last steering position errors have the same sign and when the last steering position error is zero and the new steering position error has an absolute value equal to or greater than a predetermined value, the control circuit including means for producing a control signal having a value corresponding to the calculated duty ratio;

means including a servo motor responsive to the control signal fed thereto from the control circuit for changing the steering position of the driverless vehicle for a time corresponding to the duty ratio.

4,884,203

METHOD FOR INFLUENCING THE DRIVING SPEED OF A MOTOR VEHICLE AND APPARATUS THEREFOR

Karl-Heinz Preis, Bühlertal, and Eberhard Schnaibel, Hemmingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 2, 1988, Ser. No. 151,623

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1987, 3703645

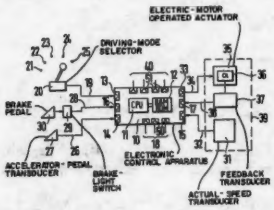
Int. Cl.[4] G05D *13/60*; B60K *31/00*

U.S. Cl. 364—426.04 21 Claims

1. A method of influencing the driving speed of a motor vehicle equipped with an internal combustion engine in dependence upon an actual speed signal and at least one driving-mode signal, which is independent of the accelerator pedal, and to which at least the two driving modes of "accelerate" and "decelerate" are assigned, the motor vehicle being equipped with a driving-mode selector for facilitating the selection of said two driving modes of "accelerate" and "decelerate", the method comprising the steps of:

metering the air/fuel mixture to the engine via an electric-motorized actuator driven by a control signal;

initially changing said control signal via a computer with a first change rate and then with a second change rate less than said first change rate and uniformly with time;



thereafter, changing said control signal via said computer uniformly with time during the time phase that at least one of said driving modes is effective;

changing said control signal via said computer at least in quasi jump-like manner at the end of said time phase; and,

then changing said control signal via said computer until a driving condition having zero acceleration is reached.

4,884,204

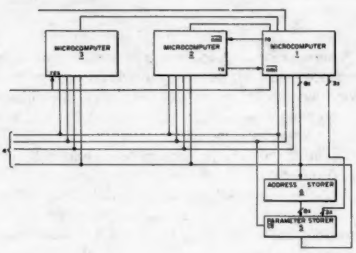
MICROCOMPUTER SYSTEM FOR REGULATING INTERNAL COMBUSTION VEHICULAR ENGINES

Artur Seibt, and Alois Kainz, both of Wien, Austria, assignors to Voest-Alpine Automotive Gesellschaft mbH, Linz, Austria

Filed Aug. 6, 1986, Ser. No. 893,656

Int. Cl.[4] G06F *15/16, 13/38*

U.S. Cl. 364—431.03 9 Claims



1. A microcomputer system for parallel processing of data and instructions, for regulating an internal combustion vehicular engine and for indicating engine status comprising:

a plurality of microcomputer modules including a first module with a microcomputer therein having internal buses for performing first priority assignments and at least a second microcomputer module with a microcomputer therein having internal buses for performing second priority assignments;

a pluggable parameter storer module having a storer/memory therein which is programmable in accordance with the specific requirements of the vehicle, the engine, the assignments of each of the microcomputers, and the priority of same; and

a combined bidirectional address and data bus for intercon-

necting said microcomputers for data transfer among said microcomputers while maintaining isolation of said combined bidirectional address and data bus from the internal buses of said microcomputers to provide substantial immunity from noise interference and further for interconnecting each of said microcomputer modules and said parameter storer module in a manner whereby said first microcomputer has first priority of access to said storer/-memory for performing first priority assignments; and

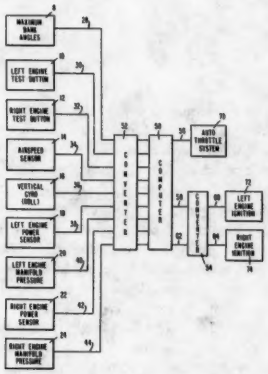
storer module being pluggable into said bidirectional address and data bus whereby the system easily can be modified for another engine or vehicle.

4,884,205

METHOD AND APPARATUS FOR LIMITING ADVERSE YAW-INDUCED ROLL DURING ENGINE FAILURE IN MULTIENGINE AIRCRAFT

Jorge H. Hernandez-Diaz, Minillas Sta. Box 41267, Santurce, P.R. 00940

Filed Aug. 4, 1987, Ser. No. 83,019
Int. Cl.[4] G05D *1/00*
U.S. Cl. 364—431.01 **19 Claims**



2. An apparatus for limiting adverse yaw caused by asymmetrically produced total thrust in a multiengine aircraft, comprising:

asymmetrical thrust detector means including engine power measurement means for measuring engine power outputs from each engine and for generating signals indicative of the corresponding thrust developed thereby;

aircraft attitude detector means for detecting aircraft attitude and producing a signal responsive thereto; and

control means responsive to said signals from said asymmetric thrust detector means and said aircraft attitude detector means for controlling said aircraft engine outputs to reduce said asymmetry of total thrust.

4,884,206

PROCESS AND PROCESSING CIRCUIT FOR THE ANALOG OUTPUT SIGNAL OF A SENSOR

Jean-Luc Mate, Toulouse, France, assignor to Bendix Electronics S.A., Toulouse, France

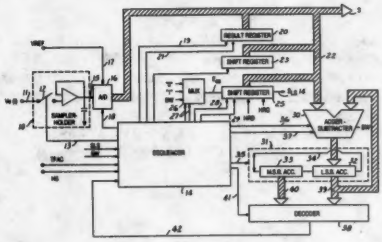
Continuation of Ser. No. 807,062, Dec. 6, 1985, abandoned. This application Jul. 1, 1988, Ser. No. 218,510
Claims priority, application France, Dec. 21, 1984, 84 19620
Int. Cl.[4] F02D *41/04*
U.S. Cl. 364—431.08 **4 Claims**

1. A digital system for processing the analog output of a sensor, in particular of an accelerometric sensor for the detection of pinking for an internal combustion engine, wherein the analog output of the sensor is bi-polar and is characterized by an integration constant, said system comprising:

means for periodically generating a measuring period signal representing a measuring period for the analog output of the sensor;

sampling means for periodically sampling the analog output of the sensor during each measuring period to produce bi-polar analog output signals;

analog-to-digital converter means responding to the bi-polar analog output samples for producing corresponding uni-polar digital values;



accumulating means for summing the uni-polar digital values produced during each measuring period to produce a sum of the uni-polar digital values occurring during each measuring period;

means for dividing the sum of the uni-polar digital values occurring during each measuring period by the integration constant characterizing the sensor to produce, for each measuring period, a modifier value; and

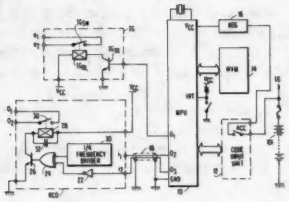
means for adjusting ignition timing of the engine as a function of such modifier values.

4,884,207

START CONTROLLER FOR ENGINE

Toru Asada, Takaoka; Kenichi Komuro, Toyota; Ryoichi Fukumoto, Nagoya, and Nozomu Torii, Hekinan, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Apr. 2, 1986, Ser. No. 847,344
Claims priority, application Japan, Apr. 2, 1985, 60-69821
Int. Cl.[4] B60R *25/00*
U.S. Cl. 364—431.03 **1 Claim**



1. A start controller for an engine of a vehicle comprising:

fuel supply means for supplying fuel to the engine;

electric driving means for supplying a current to the fuel supply means for operating the fuel supply means to supply fuel to the engine;

control means for holding a specific code, comparing an input code with the specific code to judge the coincidence and energizing the electric driver means when the specific code and the input code coincide; and

code input means for inputting the input code to the control means wherein said input means comprises a portable key

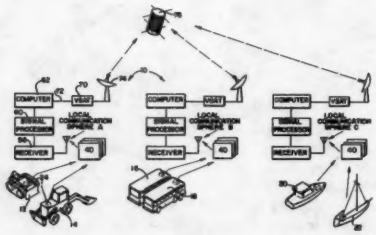
code oscillator having means for generating a signal including code information and transmitting said signal and a vehicle mounted key code receiver having means for receiving the signal generated and transmitted by the key code oscillator means for detecting input code information included in the signal and providing said input code information to said control means.

4,884,208

SYSTEM FOR CONTINUOUSLY ESTABLISHING AND INDICATING THE LOCATION OF A MOVABLE OBJECT

Orlando M. Marinelli, and Mark Rector, both of Ft. Lauderdale, Fla., assignors to Equipment Tracking Network, Inc., Ft. Lauderdale, Fla.

Filed May 16, 1988, Ser. No. 194,597
Int. Cl.[4] G01S 3/02
U.S. Cl. 364—460 2 Claims



2. A system for continuously establishing and indicating the location of a movable object comprising:

first transmitter means secured to the object for periodically transmitting, at a first predetermined frequency, first radio frequency signals representative of an identification code uniquely associated with the object;

a plurality of receiver/repeater stations positioned at spaced locations within a predetermined geographic area, each receiver/repeater station including, a plurality of spaced, first receiver means for each receiving and demodulating the first radio frequency signals to provide an object identification code signal, means associated with each first receiver means for determining the strength of the received first radio frequency signals and for generating a first radio frequency strength signal in each first receiver means;

signal processor and computer means centrally located within the predetermined geographic area and communicating with the first receiver means and the strength determining means for receiving the signals representative of the object identification code and strength signals, for calculating the location of the object based upon the strength signals and for storing signals representative of the object identification code and the location of the object; and

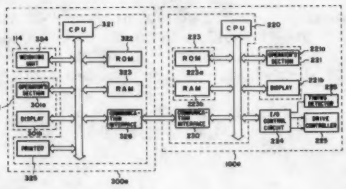
a master tracking station communicating with the signal processor and computer means for each of a plurality of predetermined geographic areas, the master tracking station including means for receiving and storing the signals representative of the object identification code and the object location, and display means for providing a visual indication of the object identification code and the object location.

4,884,209

FILM FOLDING CONTROL APPARATUS OF WRAPPING SYSTEM

Toshio Denda, Tokyo, Japan, assignor to Teraoka Seiko Co., Limited, Tokyo, Japan

Division of Ser. No. 868,509, May 30, 1986, Pat. No. 4,757,451.
This application Mar. 22, 1988, Ser. No. 172,051
Claims priority, application Japan, May 31, 1985, 60-117907
Int. Cl.[4] G06F 15/46; B65B 57/10
U.S. Cl. 364—468 13 Claims



1. A wrapping machine comprising:

a film feeding means for feeding a film cut to a predetermined length to a predetermined position of the wrapping machine, clamping edge portions of the film, so that when the film feeding is completed, the cut film is positioned approximately symmetrically in respect to the central line of the predetermined position which is perpendicular to the film feeding direction regardless of the cut film length;

film clamping means constituted by left, right, and central sections for independently clamping the right, left and central parts of the respective film edge portions which are perpendicular to the film feeding direction;

film folding means constituted by left and right folding plates and a front folding plate, wherein said left and right folding plates are disposed above the predetermined position of the wrapping machine sliding in the mutually opposite direction, for folding the lengthwise opposing edge portions of the film underneath the article to be wrapped, and said front folding plate is disposed above the predetermined position of the machine sliding in the direction perpendicular to the left and right folding plates sliding direction, for folding one edge portion perpendicular to the film lengthwise direction underneath the article to be wrapped;

infeeding means for feeding in an article to be wrapped from the direction perpendicular to the film feeding direction onto the upper side of lifting means;

lifting means for lifting the article to be wrapped fed in by said infeed means into engaging contact with the film clamped by said clamping means so that the upper part of the article to be wrapped may be covered by the film;

tension control means for adjusting the tension of the film when wrapping is completed;

wherein said tension control means controls the lengthwise film tension by controlling at least one of the left and right folding plates operating timing and releasing timing of the right and left sections of the film clamping means, and controls the film tension in the direction perpendicular to the lengthwise direction by controlling at least one of the front folding plate operating timing and the releasing timing of the central section of the film clamping means on the front folding plate side.

4,884,210

METHOD AND MACHINE FOR A BALANCING CENTERING OF WORKPIECES WHICH ARE TO BE MACHINED ONLY AT CERTAIN PORTIONS, PARTICULARLY CRANKSHAFTS

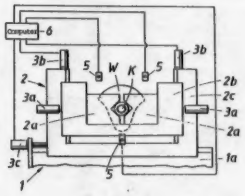
Gottfried Blaimschein, Steyr, Austria, assignor to GFM Gesellschaft für Fertigungstechnik und Maschinenbau Gesellschaft m.b.H., Steyr, Austria

Filed Nov. 16, 1987, Ser. No. 121,124

Claims priority, application European Pat. Off., Nov. 26, 1986, 86890329.5

Int. Cl.[4] G01M *1/24, 1/02;* **B23B** *49/04*

U.S. Cl. 364—474.01 **5 Claims**



1. A method for a balancing centering of a workpiece having first portions to be machined and second portions which are not to be machined along an axis of the workpiece, the workpiece portions imparting unbalances to the workpiece with respect to the axis, the method comprising the steps of

(a) gripping the unbalanced workpiece,

(b) imparting a transverse displacement to the gripped workpiece with respect to the axis to reduce the unbalance of the workpiece,

(c) cutting the gripped workpiece to length in the position resulting from the transverse displacement along two opposite end faces, and

(d) forming a respective centering bore in each end face of the gripped workpiece in the position resulting from the transverse displacement, the centering bores defining an axis of rotation for the balanced workpiece,

(e) wherein the improvement comprises the steps of

(1) measuring only the unbalances of said second workpiece portions while disregarding the unbalances of said first workpiece portions to obtain corresponding measured data and

(2) determining the extent and direction of the transverse displacement only in response to, and on the basis of, said measured data.

4,884,211

NUMERICAL CONTROL UNIT FILE PROTECTION SYSTEM

Hajimu Kishi, Hino; Kunio Tanaka, Akishima; Masashi Yukutomo, Sagamihara, and Teruyuki Matsumura, Hachioji, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

Continuation of Ser. No. 32,962, Mar. 31, 1987, abandoned, which is a continuation of Ser. No. 642,663, Aug. 17, 1984, abandoned. This application May 18, 1988, Ser. No. 196,783

Claims priority, application Japan, Dec. 29, 1982, 57-228510

Int. Cl.[4] G05B *9/00*

U.S. Cl. 364—474.22 **4 Claims**

1. A numerical control unit file protection system, comprising:

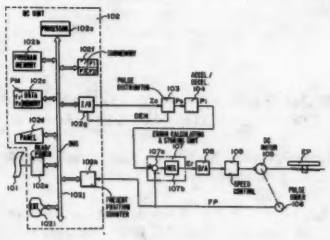
memory means for storing a control program, at least one unprotected file and at least one protected file, each protected an unprotected file having a filename, said memory means comprising:

a parameter area for storing filenames only of protected files; and

a submemory for storing the at least one protected file;

input means for inputting an object filename in a file modification command, and a processing confirmation; and

processor means for processing the file modification command by comparing the object filename with the filename of the at least one protected file and, when there



is coincidence therebetween, for performing modification processing of the at least one protected file only in response to the processing confirmation being entered on said input means after filename coincidence is determined.

4,884,212

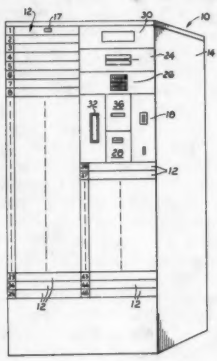
APPARATUS AND METHOD FOR USING UNIQUE CHARGE CARDS DISPENSED FROM A VENDING MACHINE

Richard Stutsman, San Diego, Calif., assignor to Vertx Corporation, Salt Lake City, Utah

Continuation-in-part of Ser. No. 29,618, Mar. 23, 1987, abandoned. This application May 29, 1987, Ser. No. 55,908

Int. Cl.[4] G07F *7/10, 11/02*

U.S. Cl. 364—479 **16 Claims**



1. A dispensing machine that can be accessed repeatedly by a card issued by the machine, the machine comprising:

storage means for holding and dispensing a plurality of products;

memory means for storing information including representations of credit amount information, customer identification code information and product location information;

processing means for accessing information in the memory means and for entering information in the memory means;

credit input means responsive to information from customer for transferring credit for the customer to the processing means for storage in the memory means;

character entry means responsive to actuation by a customer for producing representations of credit amount informa-

tion desired by the customer and communicating the credit amount information representations to the processing means;

customer card dispensing means responsive to the processing means for dispensing a customer card; and

customer card reading means coupled to the processing means for obtaining representations of information from the customer card and for communicating the representations to the processing means.

4,884,213

METHOD FOR QUANTITATIVE ANALYSIS OF ANALYTE IN LIQUID SAMPLE USING ANALYTICAL ELEMENT

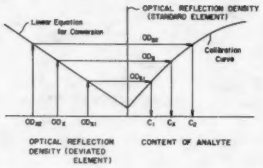
Yuzo Iwata; Hajime Makiuchi, and Masao Kitajima, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 900,533, Aug. 26, 1986, abandoned. This application Feb. 15, 1989, Ser. No. 311,444

Claims priority, application Japan, Aug. 26, 1985, 60-188226

Int. Cl.[4] G01N *35/02, 21/00*

U.S. Cl. 364—497 **7 Claims**



1. In a method for quantitatively analyzing an analyte in a liquid sample by applying the liquid sample on one of a set of analytical elements and measuring a color developed in the analytical element through reflection photometry in which said set of analytical elements are the same elements as a standard element except for deviation of sensitivity to the analyte, but said deviation of sensitivity is essentially equivalent to each other among the set of analytical elements, a calibration curve of the standard element with respect to said analyte being predetermined, the improvement comprising the steps of:

(I) applying two standard solutions containing the analyte in contents C_1 and C_2 different from each other on two analytical elements, respectively, these analytical elements being selected from said set of analytical elements, and measuring colors developed on the elements through reflection photometry to obtain optical reflection density values OD_{x1} and OD_{x2}, respectively;

(II) preparing a linear equation for defining a relationship between an optical reflection density value OD_x to be measured on an analytical element belonging to said set of the analytical elements and an optical reflection density value OD_s being predetermined on the standard analytical element, in which the optical reflection density values OD_x and OD_s are those to be determined on colors developed on the respective elements upon application of a liquid sample containing the analyte in the same content C_x, the preparation being made utilizing the calibration curve and the optical reflection density values OD_{x1} and OD_{x2} obtained in step (I);

(III) applying a liquid sample containing the analyte in an unknown amount on an analytical element belonging to said set of analytical elements, and measuring a color developed on said element through reflection photometry to obtain an optical reflection density values; and

(IV) determining the content of the analyte in the applied liquid sample according to the above-prepared linear equation and the predetermined calibration curve; wherein said linear equation is

$$OD_x = A \cdot OD_s + B$$

in which A and B are constant values obtained from the equations:

$$OD_{x1} = A \cdot OD_{s1} + B$$

$$OD_{x2} = A \cdot OD_{x2} + B$$

in which OD_{s1} is an optical reflection density value to be determined on the standard analytical element upon application of a liquid sample containing the analyte in the content C_{x1}, and OD_{x2} is an optical reflection density value to be determined on the standard analytical element upon application of a liquid sample containing the analyte in the content C_{x2}.

4,884,214

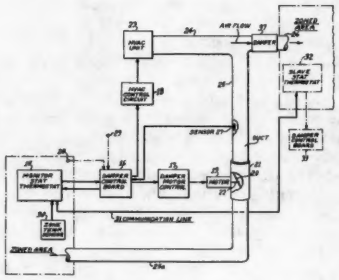
THERMOSTAT

Jeffery L. Parker, and Edward Parker, both of Jacksonville, Fla., assignors to Parker Electronics, Inc., Jacksonville, Fla.

Filed Feb. 12, 1987, Ser. No. 13,868

Int. Cl.[4] F25B *29/00*

U.S. Cl. 364—505 **73 Claims**



1. In a system for monitoring and controlling the condition of air in a zone within selectively determined operating limits using a single HVAC unit in which conditioned air passes into the zone via a damper, operated by control means, in a duct communicating with a zone, a thermostat for activating and deactivating the control means, said thermostat comprising:

first circuit means responsive to input signals for establishing the operating limits for the zone and providing a first digital word output signal representative of the operating limits;

second circuit means responsive to input signals indicative of the actual condition of the air in the zone for providing a second digital word output signal representative of the condition of the air therein;

third circuit means responsive to output signals from said first and second circuit means for providing third digital word output signals for operating the control means of the damper; and

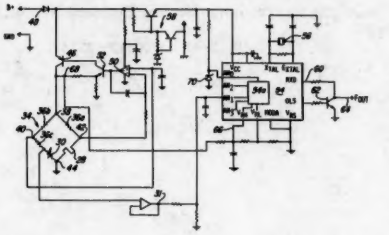
programmable logic means for providing digital word input signals to said third circuit means for selectively controlling the operation of the control means of a damper by said third circuit means.

4,884,215

AIRFLOW SENSOR AND CONTROL CIRCUIT

James A. Zboralski, Clawson; Darryl A. Hock, Harper Woods, and David L. Kaleita, Hamtramck, both of Mich., assignors to Jabil Circuit Company, Madison Heights, Mich.

Filed Feb. 27, 1987, Ser. No. 19,968
Int. Cl.[4] G01F *1/68*
U.S. Cl. 364—510 13 Claims



1. A control circuit for an airflow sensor of the type employing a flow sensing bridge having a thermal element which senses airflow and provides an indication of airflow as a function of electrical energy applied to said bridge, said bridge having a supply node to which said electrical energy is applied and said bridge having first and second control nodes for providing an indication of the balanced and unbalanced state of said bridge, the control circuit comprising:

a differential amplifier circuit means for coupling to a source of electrical energy having first and second inputs coupled to said first and second control nodes and being coupled to said supply node, for sensing the balanced and unbalanced state of said bridge and for controlling the electrical energy applied to said supply node to maintain said bridge in a substantially balanced state;

a fixed voltage reference source;

said supply node being at a voltage which varies in accordance with the electrical energy applied to said bridge;

a microcomputer having an analog to digital converter, having a memory circuit and having a serial communication output channel;

said analog to digital converter having an analog signal input channel and a reference voltage input channel;

said analog to digital converter being of the type capable of receiving an analog signal within a predetermined voltage range at said analog signal input channel and capable of receiving a fixed voltage at said reference voltage input channel;

said analog to digital converter being further of the type that when receptive of an analog signal within a predetermined voltage range at said analog signal input channel when receptive of a fixed voltage at said reference voltage input channel said analog to digital converter divides said voltage range into substantially equal increments, each increment corresponding to a different binary digit;

in said control circuit said reference voltage input channel of said analog to digital converter being coupled to said supply node to sense the electrical energy applied to said supply node as characterized by the voltage at said supply node and said analog signal input channel being coupled to said fixed voltage reference source;

said analog to digital converter when so coupled to said supply node and to said fixed voltage reference source being operable to divide said range of supply node values into substantially nonequal increments, each increment corresponding to a different binary digit;

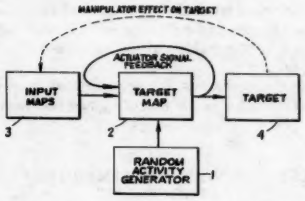
said microcomputer being receptive of said binary digits and producing a signal on said serial communication output channel which is indicative of said binary digits and thereby indicative of measured mass airflow.

4,884,216

NEURAL NETWORK SYSTEM FOR ADAPTIVE SENSORY-MOTOR COORDINATION OF MULTIJOINT ROBOTS FOR SINGLE POSTURES

Michael Kuperstein, 40 Longwood Ave., Brookline, Mass. 02146

Filed Nov. 9, 1987, Ser. No. 118,828
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—513 18 Claims



10. A method for calibrating visual and motor functions in a robot having a body and at least one arm comprising limbs and joints connecting one limb to the body and the limbs to each other with one limb having a free end, the method comprising the steps of:

a. generating a target map of random values, the values corresponding to a single random orientation of the limbs relative to their joints;

b. orienting the limbs in the single random orientation;

c. visually sensing the position of the free end of the one limb and generating an input map of values corresponding to the visually sensed position;

d. correlating the input map to the target map;

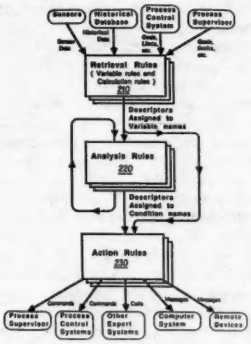
e. continuously repeating steps a-d in sequence for different random orientations to generate a correspondence between all input maps and all target maps.

4,884,217

EXPERT SYSTEM WITH THREE CLASSES OF RULES

Richard D. Skeirik, Newark, Del., and Frank O. DeCaria, Old Hickory, Tenn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 30, 1987, Ser. No. 102,832
Int. Cl.[4] G06F *15/18*
U.S. Cl. 364—513 146 Claims



1. An expert system, comprising:

a collection of inference rules, consisting of

retrieval rules, respective ones thereof including standards

for associating an attribute with an object selectively in accordance with input values; and

non-retrieval rules, respective ones thereof each performing a function selected from the group consisting of:

associating an attribute with an object selectively in accordance with object/attribute associations made by ones of said rules, and/or;

selectively executing an external command in accordance with attribute/object associations made by ones of said rules;

a processor connected to receive inputs from an input channel, to execute said collection of inference rules on said inputs, and to provide outputs on an output channel accordingly,

wherein said processor is not programmed to perform any purely arithmetic test while executing said non-retrieval rules.

4,884,218

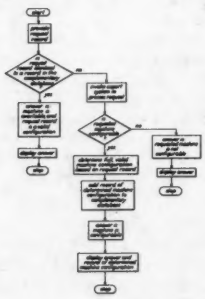
KNOWLEDGE SYSTEM WITH IMPROVED REQUEST PROCESSING

Palmer W. Agnew, Owego; Neil H. Clayton, Apalachin; Monroe Judkovics, Endwell, all of N.Y.; Jose L. Rivero, Boca Raton, Fla., and Kuo-chang Sun, Endicott, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 1, 1987, Ser. No. 103,810

Int. Cl.[4] G06F *15/00*

U.S. Cl. 364—513 **14 Claims**



1. A knowledge system to determine a machine configuration of a given type from a requested machine configuration, each machine configuration having a record including a plurality of parameters, taken from a given family of parameters, and a value for each of said plurality of parameters, the knowledge system comprising:

an expert system to process the record of the requested machine configuration to determine therefrom a machine configuration of the given type;

a complementary database storing a plurality of records of machine configurations of the given type, all of the values for each one of the parameters of the records stored in the complementary database forming a value set associated with said one parameter;

search means to search the complementary database for a record identical to the record of the requested machine configuration, and to indicate to a requestor that the requested machine configuration is of the given type if a record identical to the record of the requested machine configuration is found in the complementary database, and including means to search all of the value sets associated with the parameters of the record of the requested machine configuration, one value set at a time, for all of the values in each value set identical to the value of the associated parameter of the record of the requested machine configuration; and

input means to receive from the requestor the record of the requested machine configuration, and to transmit the record thereof to the search means.

4,884,219

METHOD AND APPARATUS FOR THE PERCEPTION OF COMPUTER-GENERATED IMAGERY

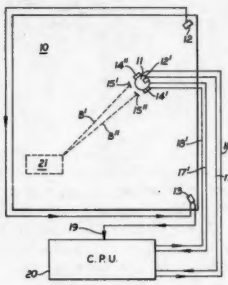
Jonathan D. Waldren, Melton Mowbray, United Kingdom, assignor to W. Industries Limited, Leicester, United Kingdom

Filed Jan. 15, 1988, Ser. No. 144,090

Claims priority, application United Kingdom, Jan. 21, 1987, 8701288

Int. Cl.[4] G06F *15/62, 15/20;* G06K *15/00*

U.S. Cl. 364—514 **8 Claims**



1. A 3-dimensional display system comprising:

headwear having means mounted thereon to project individual images of a 3-dimensional object into respective eyes of a person wearing said headwear,

means for monitoring variations of spatial coordinates relating to said wearer,

means for monitoring variations of an orientation of said wearer's head,

means for monitoring a line of sight of each said eye of said wearer and for monitoring variations of an angle of convergence of said lines of sight,

computer means for generating two images of the three-dimensional object having spatial coordinates, and

means for modifying said images in response to variations of a relationship between said spatial coordinates, said orientation and said angle of convergence,

such that the image presented to each said eye is of said 3-dimensional object as seen by said eye at a distance from said wearer determined by said angle of convergence whereby said wearer perceives said object stereoscopically.

4,884,220

ADDRESS GENERATOR WITH VARIABLE SCAN PATTERNS

John F. Dawson; Joseph W. Bednarski, both of Albuquerque; Marie A. Stoffer, Rio Rancho, and James A. Cousens, Albuquerque, all of, assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 7, 1988, Ser. No. 203,660

Int. Cl.[4] G06F *15/62*

U.S. Cl. 364—521 **14 Claims**

1. An address generator for scanning a first addressable memory logically configures in a rectangular matrix wherein a pattern of data is stored in a predetermined orientation with respect to said matrix, and for writing to a second addressable memory comprising:

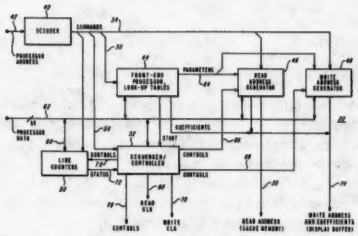
input means for receiving parameters from an external source, said parameters being programmable for providing a predetermined scan pattern from a plurality of scan

patterns substantially independent of said predetermined orientation,

processor means coupled to receive said parameters for computing angles of an envelope defining the contour of a scan pattern and angles of rotation for successive lines of said scan pattern.

read address generator means responsive to said processor means for selectively generating address signals so as to read out said pattern information in a given direction with respect to said predetermined orientation, wherein said given direction is substantially independent of said predetermined orientation, and for providing incremental horizontal and vertical values of read addresses for generating each line of said scan pattern and reading values of digital signals stored in said first memory at corresponding addresses,

write address generator means coupled to receive said parameters in the form of a first parameter defining a starting point of a first scan line, a second parameter defining the



slope of said scan line, and a third parameter defining the slope of starting points of successive scan line, said first, second, and third parameters being dynamically and sequentially variable in accordance with command signals from said external source to form one of said plurality of scan patterns, for generating sequential write addresses for writing into said second addressable memory configured in a rectangular matrix,

counter means for counting the number of incremental addresses in accordance with a predetermined line length and the number of scan lines in accordance with a predetermined line count and for providing a signal indicative of the completion of a scan line and a signal indicative of the generation of a complete frame at the completion of said line count, and

timing means for generating timing and sequencing signals for generating each scan line, reading said first addressable memory along said scan lines, and writing the contents of said addressable memory into said second addressable memory.

4,884,221

COLOR MEASURING APPARATUS

Masami Sugiyama, Toyonaka; Nobuyuki Kita, Osaka, and Yoshihiro Tasaka, Nishinomiya, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 14, 1987, Ser. No. 38,366

Claims priority, application Japan, Apr. 14, 1986, 61-87535; Apr. 14, 1986, 61-87537

Int. Cl.[4] G06F *15/20*; G01J *3/50*

U.S. Cl. 364—526 **20 Claims**

9. A color measuring apparatus comprising:

a photoelectric conversion means which separates light from a sample into a plurality of predetermined basic color components so as to output basic color signals corresponding to quantities of light of the basic color components, respectively; and

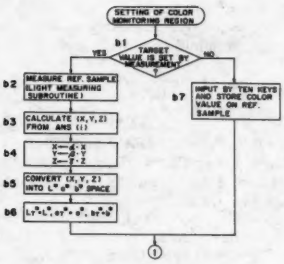
a data processing means including:

a calculating means which converts the basic color signals from said photoelectric conversion means into coordinates defined by a predetermined colorimetric system so as to calculate a color value of the sample,

a region setting means for setting a predetermined region in the colorimetric system,

a decision means for deciding whether or not the color value calculated by said calculating means falls within the predetermined region, and

a control means for controlling a time interval of measurement of the sample, which actuates, when it is decided by said decision means that the color value falls out of



the predetermined region, said photoelectric conversion means, said calculating means, said region setting means and said decision means at a first time interval so as to automatically repeat measurement of the sample,

said control means actuating, when it is decided by said decision means that the color value falls within the predetermined region, said photoelectric conversion means, said calculating means, said region setting means and said decision means at a second time interval different from the first time interval so as to automatically repeat the measurement of the sample.

4,884,222

FIRE ALARM SYSTEM

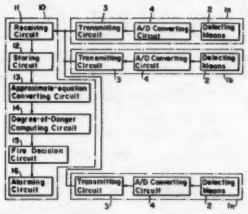
Tetsuya Nagashima, Tokyo; Eiji Matsushita, Yokohama; Sadataka Yuchi, Sagamihara, and Akira Kitajima, Yokohama, all of Japan

Continuation-in-part of Ser. No. 582,316, Feb. 22, 1984, abandoned. This application Jul. 29, 1985, Ser. No. 760,312

Claims priority, application Japan, Jul. 31, 1984, 59-160850

Int. Cl.[4] G08B *17/00*

U.S. Cl. 364—550 **22 Claims**



1. A fire alarm system which comprises:

one or more detecting sections for detecting a change in the physical phenomen of the surroundings related to the occurrence of a fire and outputting analog data corresponding to the change;

a data sampling section for sampling the data from each of the detecting sections at periodic intervals;

a storing section for storing the data output from the data sampling section for each of; said detecting sections;

a computing section for sequentially extracting the data from said storing section, computing from such data an approximation equation of said change, and computing a future value of said phenomen predicted from said approximation equation by using a predetermined number of the data stored in said storing section;

a comparing section for comparing said future value predicted by said computing section with a preliminarily set data value related to fire alarming and generating an output when the relation therebetween is not within a predetermined range; and

an alarming section for generating an alarm in response to the output from said comparing section.

4,884,223

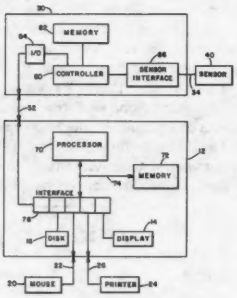
DYNAMIC FORCE MEASUREMENT SYSTEM

Lloyd D. Ingle, Valley Center; Henry V. Allen, and James W. Knutti, both of Fremont, all of Calif., assignors to Hybond, Inc., Escondido, Calif.

Continuation of Ser. No. 752,967, Jul. 5, 1985, abandoned. This application Mar. 22, 1988, Ser. No. 170,036

Int. Cl.[4] G01M *7/00;* **G01F** *1/375;* **B25J** *19/00*

U.S. Cl. 364—550 **14 Claims**



1. A dynamic bond force measurement system for taking a series of force measurements of force applied by a wire bonding tool, the system comprising:

a sensor device for positioning beneath a wire bonding tool, comprising a substrate platform, a transducer element mounted on said platform, and a pressure pedestal mounted on said transducer element for receiving the force applied by a wire bonding tool;

the transducer element comprising means for detecting forces between the pedestal and the substrate platform in the range form 0.00 to 2.00 lbs. and for producing a continuous analog output signal in the range form 0.00 to 100.00 millivolts in relation to said force;

a sensor interface device for receiving said analog output signal, the interface device comprising analog to digital converter means for converting said analog output signal, data storage means for storing discrete values of said digital output signal at a preselected sample rate, triggering means for initiating said data storage, and output means for transmitting said stored digital output signals; and

data processing means for receiving said digital output signals from said interface device, means for storing said received signals, and means for generating from said signals a graphical representation of the applied force relative to time.

4,884,224

METHOD FOR GENERATING IMAGE CONTOUR DATA AND APPARATUS THEREFOR

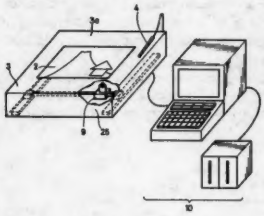
Makoto Hirosawa, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Jan. 22, 1988, Ser. No. 147,354

Claims priority, application Japan, Jan. 23, 1987, 62-13837; Jul. 10, 1987, 62-171165

Int. Cl.[4] G06F *15/20;* **G05B** *1/00*

U.S. Cl. 364—550 **26 Claims**



1. Image contour data generating apparatus, comprising:

a single integrated inputting unit comprising an original film holding means, a scanning position input means and a contour position detecting means;

said original film holding means being effective for holding an original film having an image thereon, said image having an image contour to be detected;

said scanning position input means being effective for permitting an operator of said apparatus to identify a scanning position on said film holding means, and therefore a scanning position on said original film, corresponding to a selected portion of said image contour;

said contour position detecting means including a scanning image sensor and being effective for moving said scanning image sensor to said scanning position, while said original film remains positioned at said original film holding means, said contour position detecting means being further effective for causing said image sensor to scan an area of said original film corresponding to said portion of said image contour and for generating an output signal indicative of said scanned area of said original film scanned by said image sensor; and

arithmetic means for determining an actual contour of said selected portion of said image contour on the basis of said output signal.

4,884,225

FILTERING IN 3-D VISUAL SYSTEM

Kevin E. Fogarty, Mass.; Fredric S. Fay, both of Worcester; Louise M. Isenstein, Littleton, all of Mass., and James M. Coggins, Chapel Hill, N.C., assignors to University of Massachusetts Medical Center, Worcester, Mass.

Filed Apr. 3, 1987, Ser. No. 34,893

Int. Cl.[4] G06F *15/42, 15/70*

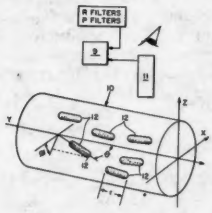
U.S. Cl. 364—559 **22 Claims**

1. Apparatus for locating positions and measuring sizes of bodies in a 3-D fluorescense image, comprising:

spatial filter means comprised of a plurality of spacial filters for locating bodies of different sizes within a predetermined range of sizes, each spatial filter for locating bodies of one predetermined size, different spatial filters for locating bodies of different predetermined sizes; and

convolution means for convolving each spacial filter with the image to locate bodies of at least the respective predetermined size, convolution responses of successive filters providing a size measurement of a body, the respective

predetermined size of a largest filter providing an increasing convolution response to the body determining size



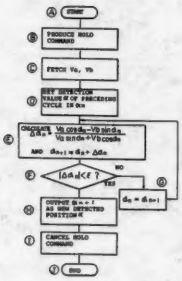
measurement of the body and determining size of spacial filter for providing orientation of the body.

4,884,226

METHOD FOR DETECTING POSITION

Tetsuro Sakano, Yamanashi, Japan, assignor to Fanuc Ltd., Yamanashi, Japan

Continuation of Ser. No. 887,162, Jul. 3, 1986, abandoned. This application Oct. 24, 1988, Ser. No. 262,081
Claims priority, application Japan, Nov. 5, 1984, 59-231354
Int. Cl.[4] H03K *13/08;* **G06F** *15/20*
U.S. Cl. 364—560 **5 Claims**


A START
B PRODUCE HOLD COMMAND
C FETCH Va, Vb
D SET DETECTION VALUE N OF PRECEDING CYCLE IS 0
E CALCULATE Δθn+1 = Va cosθn − Vb sinθn + Vb cosθn AND θn+1 = θn + Δθn
F |Δθn|<ε ?
NO
YES
G
θn = θn+1
H OUTPUT θn+1 AS NEW DETECTED POSITION N
I CANCEL HOLD COMMAND
J END

1. A method for detecting a position comprising the steps of:

using a rotary encoding plate having a plurality of channels for generating a two-phase sinusoidal wave signals having a 90° -spatial phase difference therebetween, among which a first channel is formed to obtain 1 cycle of a sinusoidal wave during a single rotation of the rotary encoding plate, a second channel is formed to obtain N cycles of the sinusoidal wave, where N is an integer larger than two, during the single rotation of the rotary encoding plate, and other channels are similarly formed to obtain increased number of cycles of the sinusoidal wave;

producing a plurality of pairs of two-phase sinusoidal wave signals using said rotary encoding plate, said plurality of pairs of two-phase sinusoidal wave signals having a 90° -spatial phase difference therebetween upon movement of a moving object, and each pair having a different wavelength from another pair;

detecting a current voltage values V_a and V_b of the two-phase sinusoidal wave signals of the first channel and calculating

the phase angle α of the sinusoidal wave of the first channel, by solving an equation $V_a \cdot \cos\alpha - V_b \cdot \sin\alpha = 0$ where α is a variable, on condition that polarities of $\sin\alpha$ and $\cos\alpha$ for the calculated α coincide with those of V_a and V_b, respectively;

detecting a current voltage values V_c and V_d of the two-phase sinusoidal wave signals of the second channel and calculating the phase angle β of the sinusoidal wave of the second channel by solving the equation $V_c \cdot \cos\beta - V_d \cdot \sin\beta = 0$ where β is a variable, on condition

that polarities of $\sin\beta$ and $\cos\beta$ for the calculated β coincide with those of V_c and V_d, respectively; and

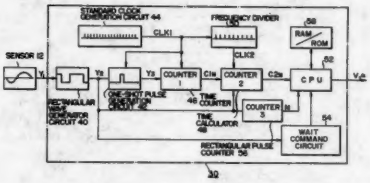
detecting a moving position of a moving object by obtaining phase angle over a plurality of cycles of the two-phase signals of the short wavelength from the values of α, β, . . . determined as per the preceding steps so that the rotary positions over a single rotation of the rotary encoding plate are detected as absolute position date.

4,884,227

SPEED DETECTING APPARATUS FOR A VEHICLE

Masao Watanabe, Nagoya, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 11, 1987, Ser. No. 132,066
Int. Cl.[4] G01P *11/00, 15/00*
U.S. Cl. 364—565 **6 Claims**



1. A speed detecting apparatus for vehicles having a rotor provided with a multiplicity of protrusions on the peripheral surface thereof and a sensor which is attached to a stationary side of a vehicle in such a manner as to face said rotor and wherein said sensor outputs an AC signal when each of said protrusions of said rotor passes in front of said sensor to calculate at least one of the speed and acceleration of vehicles on the basis of said AC signal, said speed detecting apparatus comprising:

rectangular wave generation circuit means for converting an AC signal into a number of rectangular pulses and outputting the generated rectangular pulse signals;

rectangular pulse counter means for counting the rectangular pulse signals and outputting the counted value as a pulse number count signal which indicates the number of the rectangular pulses;

time counter means for cumulatively counting clock pulses and outputting the cumulative count value as a time count signal which indicates the time at the rise point or the fall point of a rectangular pulse every time said rectangular pulse rises or falls;

time calculator means for calculating the time for outputting the c enter position of a peak side rectangular pulse or a trough side rectangular pulse on the basis of said time count signal and outputting the calculated value as a center position time signal;

memory circuit means for storing said pulse number count signal and said center position time signal corresponding to said pulse number count signal on the basis of a read signal; and

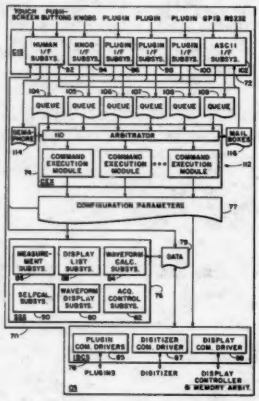
speed calculation means for calculating a first difference between preceding written data and present data of the pulse number count signal, calculating a second difference between preceding written data and present data of the center position time signal, and calculating said at least one of the speed and acceleration on the basis of said first and second differences, thereby detecting the speed and the acceleration without being influenced by a low frequency swell component and a high frequency noise component contained in said AC signal.

4,884,228

FLEXIBLE INSTRUMENT CONTROL SYSTEM

James C. Stanley, Portland, and Brian D. Diehm, Lake Oswego, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 14, 1986, Ser. No. 918,430
Int. Cl.[4] G06F *15/20;* G05B *23/02*
U.S. Cl. 364—579 6 Claims



1. An instrument comprising:
a computer for producing at least one output signal;
first means for carrying out an instrumentation operation in any one of a plurality of operating modes determined according to said at least one output signal;
a plurality of control signal sources, each for producing at least one control signal;
interface means for providing input to said computer indicating when each of said control signal is produced; and
memory means accessed by said computer for storing a plurality of command execution modules, at least one command execution module comprising instructions for said computer to produce said at least one output signal for determining the operating mode of said first means, said memory means also storing in addition to the command execution modules instructions for causing said computer to generate commands and to store said commands in said memory means as they are generated, each command being generated in response to production of a corresponding one of said control signals indicated by said interface means and each command identifying a corresponding command execution module, and said memory means storing instructions for causing said computer to execute in a predetermined order of priority instructions included in each command execution module identified by each stored command.

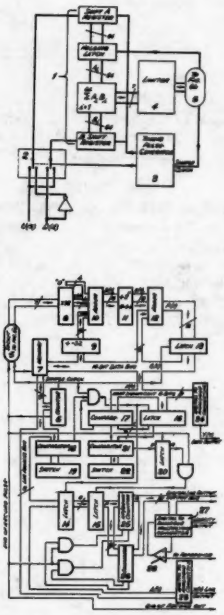
4,884,229

METHOD AND APPARATUS FOR REMOVING NOISE

David L. Dekker, Mount Isa, Australia, assignor to Mount Isa Mines Limited, Australia

Continuation of Ser. No. 748,735, Jun. 25, 1985, abandoned.
This application Oct. 26, 1988, Ser. No. 265,282
Claims priority, application Australia, Jul. 4, 1984, PG5841
Int. Cl.[4] G06F *15/31, 15/336*
U.S. Cl. 364—724.11 20 Claims

1. Apparatus for removing noise common to a first signal and a second signal correlated with the first signal, said apparatus comprising:
correlator means for providing an output signal indicative of the difference between the cross correlation of the first and second signals as a function of positive time lag of the first signal with respect to the second signal, and the cross correlation of the first and second signals as a function of negative time lag of the first signal with respect to the second signal, said correlator means comprising a signal correlator having a first circuit input, a second circuit input, and providing a signal which is indicative of the cross correlation of signals applied to the circuit inputs as a function of time lag of one input signal with respect to the other, and means for switching inputs between a positive time lag mode and a negative time lag mode, said switching means in the positive time lag mode directing the first signal to the first circuit input and the second signal to the second circuit input and said switching means in the negative time lag mode directing the first signal to the second circuit input, and the second signal to the first circuit input, wherein the correlator means includes means for inverting one of the input signals applied in one of the modes.



4,884,230

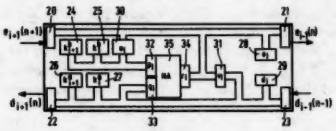
DIGITAL LATTICE FILTER

Gerardus C. M. Gielis; Antonius J. P. Bogers, and Steven J. W. Van Lerberghe, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 4, 1988, Ser. No. 209,448
Int. Cl.[4] G06F *15/31*
U.S. Cl. 364—724.15 9 Claims

1. A digital lattice filter, comprising a plurality of identical filter stages each having a pair of inputs for receiving input signals and a pair of outputs for supplying output signals, these stages being connected in a cascade arrangement, each stage consisting in no less than two mutually linked branches, no less than one of these branches comprising delay means, a number of successive cascaded filter stages, of the plurality of filter stages, forming a group, at least first and second branches in each group of filter stages comprising delay means such that

the time delay in the first branch is equal to the time delay in the second branch, characterized in that each group comprises an even number of successive cascaded filter stages and in that each group comprises a single processing unit which calculates



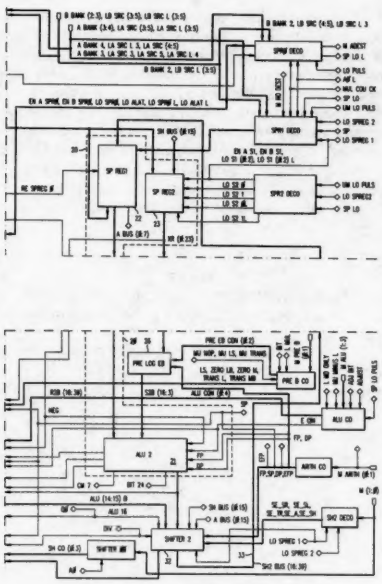
during a sample interval the two output signals on the basis of the two input signals, whilst the processing units of the successive groups calculate the output signals for different sample instants.

4,884,231

MICROPROCESSOR SYSTEM WITH EXTENDED ARITHMETIC LOGIC UNIT

Yeshayahu Mor, and Leonardo Sandman, both of Cupertino, Calif., assignors to Performance Semiconductor Corporation, Sunnyvale, Calif.

Filed Sep. 26, 1986, Ser. No. 912,756
Int. Cl.[4] G06F 7/00
U.S. Cl. 364—736 **3 Claims**



1. In a microprocessor for processing operands, said microprocessor having a primary arithmetic logic unit (ALU) having a plurality of inputs and an output with a first shifter connected thereto, said primary ALU having a capability of handling operands of a predetermined number of bits, said predetermined number of bits being less than the total number of bits in said operands in some operations, the improvement comprising:

an auxiliary ALU operating in conjunction with said primary ALU and said first shifter,

said auxiliary ALU having a plurality of inputs and an output having a second shifter connected thereto;

a plurality of special registers connected to said inputs of said auxiliary ALU;

means for supplying some of said total number of operand bits to said special registers;

means for loading said some of said total number of operand bits from said special registers into said auxiliary ALU;

means for processing said loaded bits in said auxiliary ALU;

means for selecting bits from said operands for said primary ALU during said processing of said bits in said auxiliary ALU;

first and second latch means for receiving said selected operand bits for said primary ALU;

prelogic means connected to receive the outputs of said first and second latch means,

means for connecting said first and second latch means to said inputs of said primary ALU through said prelogic means;

means for supplying and processing said selected bits in said primary ALU after said processing of said loaded operand bits in said auxiliary ALU; and

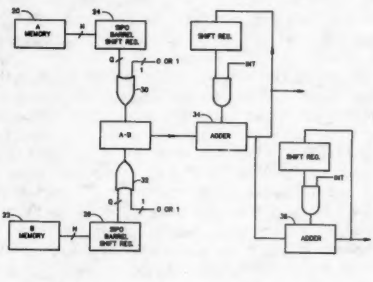
means for exchanging selected bits between said first shifter and said second shifter to shift the outputs of said primary ALU and said auxiliary ALU in either direction.

4,884,232

PARALLEL PROCESSING CIRCUITS FOR HIGH SPEED CALCULATION OF THE DOT PRODUCT OF LARGE DIMENSIONAL VECTORS

Richard S. Schlunt, Loma Linda, Calif., assignor to General Dynamics Corp., Pomona Div., Pomona, Calif.

Filed Dec. 14, 1987, Ser. No. 133,096
Int. Cl.[4] G06F 15/347, 7/52
U.S. Cl. 364—754 **1 Claim**



1. A circuit for calculating a(i)·b(j) where a(i) is the vector $(a_1(i), a_2(i) \ldots, a_{\alpha}(i))$, b(j) is the vector $(b_1(j), b_2(j), \ldots b_{\beta}(j))$, each $a_k(i)$ is a zero or a one, and each $b_k(j)$ is a zero or a one, comprising:

first memory means for storing digital signals representing a(i);

second memory means for storing digital signals representing b(j);

a first serial-in-parallel-out barrel shift register for creating the bit planes a(o), . . . ,a(N−1) from the digital signals stored in the first memory means;

a second serial-in-parallel-out barrel shift register for creating the bit planes b(o), . . . ,b(N−1) from the digital signals stored in the second memory means;

a first OR gate having a first input connected to the first serial-in-parallel-out barrel shift register;

a second OR gate having a first input connected to the second serial-in-parallel-out barrel shift register;

means for applying a zero or a one to a second input of each of the OR gates;

a correlator connected to an output of the first OR gate and an output of the second OR gate; and

mean connected to the correlator for summing a plurality of successive outputs of the correlator.

4,884,233

FAST SUMMING CIRCUIT

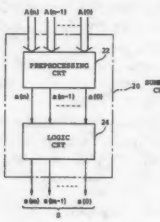
Akira Ishizuka, Tokyo, and Toshihiko Nakamura, Yamanashi, both of Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jun. 14, 1988, Ser. No. 207,110

Claims priority, application Japan, Jun. 15, 1987, 62-148791; Jun. 15, 1987, 62-148792

Int. Cl.[4] G06F *7/50*

U.S. Cl. 364—786 **7 Claims**



1. A summing circuit for summing up zeroth through n-th input data signals to produce a sum signal, where n represents a first predetermined natural number, each of said zeroth through said n-th input data signals consisting of (m+k+1) bit arranged from a most significant bit 2^{m+k} to a least significant bit 2^0, where m represents a second predetermined natural number and k represents a predetermined integer which is not less than zero, said sum signal consisting of (m+1) bits arranged from said most significant bit 2^{m+k} to a k-th bit 2^k as counted from said least significant bit 2^0, said summing circuit comprising:

preprocessing means responsive to said zeroth through said n-th input data signals for preprocessing said zeroth through said n-th input data signals to a preprocessed signal which is (n+1) bits arranged from a most significant bit 2^n to a least significant bit 2^0, said least through said most significant bits 2^0 to 2^n of the preprocessed signal being equal to the most significant bits 2^{m+k} of said zeroth through said n-th input data signals, respectively; and

logical operation means coupled to said preprocessing means for carrying out a logical operation on said preprocessed signal to produce said sum signal.

4,884,234

DYNAMIC RAM REFRESH CIRCUIT WITH DMA ACCESS

John B. Keys, and David A. Rieker, both of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Jun. 29, 1987, Ser. No. 67,761

Int. Cl.[4] G06F *15/00, 12/00*

U.S. Cl. 364—900 **8 Claims**

1. In a data processing system including a data processor, a dynamic memory and a peripheral device coupled to said processor for requesting access to the dynamic memory, a memory controller comprising:

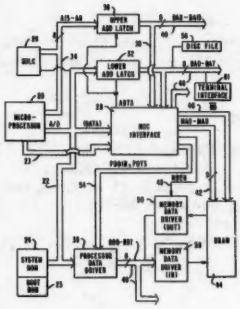
means for refreshing the dynamic memory when enabled;

first circuit means responsive to first status signals and timing signals outputted from said processor for generating a first control signal to enable said refreshing means;

second circuit means responsive to a second status signal from the processor acknowledging the request of the peripheral device for generating a second control signal to transfer control of the memory to the requesting peripheral device;

third circuit means coupled to said first circuit means and said processor for generating a third control signal representing the simultaneous occurrence of said first control signal and said second status signal; and

fourth circuit means coupled to said first and second circuit means for disabling the second circuit means from generating said second control signal in response to the generation of said third control signal and said second status signal thereby disabling the requesting peripheral device



from accessing the memory and enabling the memory to be refreshed prior to the time the control of the memory is transferred to the requesting peripheral device by the processor wherein said second circuit means includes a bistable member operated by said timing signals to output said second control signal in response to receiving said second status signal, and further includes a gating circuit coupled to one input of said bistable member for outputting a binary signal disabling said bistable member from outputting said second control signal in response to receiving said third control signal and said second status signal.

4,884,235

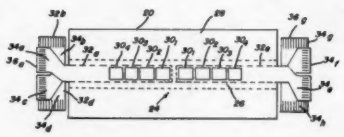
MICROMAGNETIC MEMORY PACKAGE

Alfred A. Thiele, 262 N. Dithridge St., No. 306, Pittsburgh, Pa. 15213

Filed Jul. 19, 1988, Ser. No. 221,349

Int. Cl.[4] G11C *5/04, 19/08*

U.S. Cl. 365—2 **16 Claims**



1. A package for a micromagnetic memory, comprising:

a plurality of truncated confocal ellipsoidal means layers and having a common opening therethrough along a central axis for receiving said memory therein, said layers including,

an outer layer of first type ferromagnetic material for providing a shield against external fields,

an inner layer of second type ferromagnetic material for producing a static field transverse to said central axis substantially uniformly throughout the spatial volume defined by said opening,

an inner layer comprising an electromagnetic coil structure

for generating a time varying field in said volume for controlling a micromagnetic data storage element of said micromagnetic memory, and

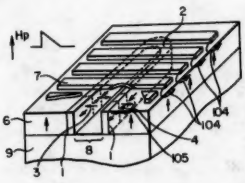
an inner layer of third type ferromagnetic material located between the layer of second type ferromagnetic material and said electrical coil structure for providing a flux return path for the time varying field generated by said coil structure and increasing the permeance of said inner layer of second type ferromagnetic material.

4,884,236

BLOCH LINE MEMORY DEVICE

Youzi Maruyama, Hachioji; Tadashi Ikeda, Kanagawa, and Ryo Suzuki, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 9, 1987, Ser. No. 106,346
Claims priority, application Japan, Oct. 9, 1986, 61-239010
Int. Cl.[4] G11C *19/08*
U.S. Cl. 365—29 **10 Claims**



1. A Bloch line memory device comprising:

a magnetic film for holding magnetic bubble domains, said magnetic film being formed on a substrate so that its film plane has a (111) face;

a plurality of stripe magnetic domains formed in said magnetic film, each of the stripe magnetic domains being arranged to enclose a different one of groovings formed in a part of said magnetic film, the stripe magnetic domains having a Bloch line pair as an information carrier in the magnetic wall of the stripe magnetic domain, the stripe magnetic domain being arranged with its longitudinal direction in parallel to either the crystalographic directions, $[11\bar{2}]$ and, $[\bar{1}12]$, $[1\bar{2}1]$ and, $[\bar{1}2\bar{1}]$, or $[\bar{2}11]$ and $[2\bar{1}\bar{1}]$ of said magnetic film;

write means for writing the Bloch line pair in the stripe magnetic domain in accordance with information; and

read means for reading information on the basis of the presence or absence of the Bloch line pair in the stripe magnetic domain.

4,884,237

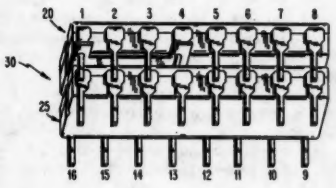
STACKED DOUBLE DENSITY MEMORY MODULE USING INDUSTRY STANDARD MEMORY CHIPS

Wolfgang R. Mueller, Wappingers Falls, and Gwynne W. Spencer, II, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 594,184, Mar. 28, 1984, abandoned.
This application Mar. 17, 1989, Ser. No. 324,958
Int. Cl.[4] G11C *5/06*; H01R *9/00*; H05K *1/00*
U.S. Cl. 365—63 **33 Claims**

17. A double density memory module comprising:

first and second industry standard memory chips, each of which includes a plurality of address, power supply and data pins, a chip select pin and an unused pin, in the same pin positions on said first and second chips, with the pins on said first chip directly connected to the corresponding pins on said second chip, except for said chip select pins; and



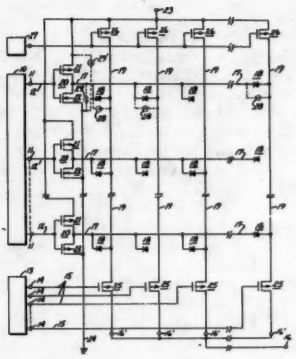
a conductive strap connecting said chip select pin and said unused pin on said first chip.

4,884,238

READ-ONLY MEMORY

Kang W. Lee, Wayzata, and Robert L. Rabe, Maple Grove, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 9, 1988, Ser. No. 165,852
Int. Cl.[4] G11C *17/06*
U.S. Cl. 365—105 **25 Claims**



1. A monolithic integrated memory circuit, said memory comprising:

a semiconductor material body of a first conductivity type in at least a first portion thereof, forming a first body portion, except in a plurality of isolating regions in said first body portion which plurality includes multiple pluralities of said isolating regions each of which has those said isolating regions included therein electrically interconnected to one another to form an interconnection plurality thereby forming multiple interconnection pluralities of said isolating regions, said semiconductor material body having a first major surface which is intersected by selected ones of said plurality of isolating regions with each of said isolating regions being of a second conductivity type;

a plurality of memory point regions which comprises multiple first constituent pluralities of said memory point regions with each of said multiple interconnection pluralities of said isolating regions having those said memory point regions of one of said first constituent pluralities located therein, said plurality of memory point regions also comprising multiple second constituent pluralities of said memory point regions with each of said second constituent pluralities having one of those said memory point regions therein located in each one of said multiple interconnection pluralities of said isolating regions, each said memory point regions being of said first conductivity type

and intersecting said first major surface but otherwise being surrounded by that said selected isolating region in which that said memory point region is located;

a plurality of first interconnection means with there being one of said first interconnection means electrically connected to each of said multiple interconnection pluralities of said isolating regions, and to a first circuit selection means;

a plurality of second interconnection means each being electrically connected to a terminating region of a field-effect transistor in a second circuit selection means, there being one of said plurality of second interconnection means being provided for each of said second constituent pluralities but with only selected ones of those said memory point regions in a said second constituent plurality thereof being electrically connected to that said second interconnection means corresponding thereto; and

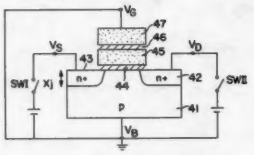
a plurality of second interconnection means impedances each having first and second terminating regions between which a selected conductivity is established, said first terminating region of each of said plurality of second interconnection means impedances being electrically connected to a first terminal means adapted for connection to a first source of voltage, said second terminating region of each of said plurality of second interconnection means impedances being electrically connected to a corresponding one of said plurality of second interconnection means.

4,884,239

METHOD FOR ERASING DATA IN A SEMICONDUCTOR MEMORY DEVICE

Takashi Ono, and Shooji Kitazawa, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 177,612
Claims priority, application Japan, Apr. 6, 1987, 62-82988
Int. Cl.[4] G11C *11/34*
U.S. Cl. 365—185 **19 Claims**



1. A method for erasing data stored in a semiconductor memory device, wherein the device comprises an MOS transistor having a substrate, a source formed on said substrate, a drain formed on said substrate at a distance from said source, and a control gate and a floating gate as a memory unit, and wherein data writing is effected by the generation of an MOS-channel current of sufficient magnitude so that an electrical charge is injected into said floating gate, this data-erasure method being characterized in that said injected electrical charge is effectively removed by:

applying between said control gate and the substrate a predetermined potential which allows essentially no channel region to be created on said substrate between said source and said drain;

applying between said source and said substrate a first predetermined reverse-bias voltage of sufficient magnitude so as to allow essentially no current to flow between said source and said substrate; and

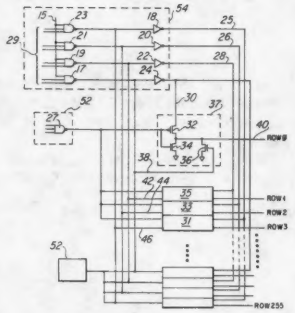
applying between said drain and substrate a second predetermined reverse-bias voltage which is greater than said first predetermined reverse bias voltage so as to allow an avalanche current to flow between said drain and said substrate and no channel current to flow between said source and said drain.

4,884,240

STATIC ROW DRIVER

Stanley M. Dennison, Jonesborough, and Cordell E. Prater, Johnson City, both of Tenn., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 19, 1986, Ser. No. 876,140
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—189.09 **4 Claims**



1. A CMOS static row driver circuit for an array of memory cells having 2N row lines configured in 2N/k groups of k rows to select one row line in a group with decoders, said circuit comprising:

a plurality of P-type transistors each connected to control current flow through one of the 2N row lines each P-type transistor having a first source/drain electrode connected to a row line, a second source/drain electrode and a gate electrode; 2N/k decoders each connected to a group of k row lines to effect selective provision of charge to one row line in a group, each decoder capable of providing an input signal to the gate electrode of any P-type transistor in the group;

k additional decoders each connected to selectively provide current flow through a different row line in every group, each of said additional decoders coupled to the second source/drain electrode of a different P-type transistor in each of the 2N/k groups;

a first plurality of N-type pull down transistors each having a first source/drain electrode coupled to a row line, a second source/drain electrode coupled to a reference potential and a gate electrode, said first plurality of N-type pull down transistors arranged in groups of k transistors with all of the gate eletrodes of the transistors in each group connected to one of the 2N/k decoders; and

a second plurality of N-type pull down transistors each having a first source/drain electrode coupled to a row line, a second source/drain electrode coupled to a reference potential and a gate electrode, said second plurality of N-type pull down transistors arranged in groups of k transistors with each of the gate eletrodes of the transistors in a group connected to a different one of the k decoders.

4,884,241

NONVOLATILE SEMICONDUCTOR MEMORY DEVICE

Sumio Tanaka; Shigeru Atsumi, both of Tokyo, and Shinji Saito, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 29, 1989, Ser. No. 330,040
Claims priority, application Japan, Mar. 31, 1988, 63-78722
Int. Cl.[4] G11C *7/00*
U.S. Cl. 365—210 **6 Claims**

1. A nonvolatile semiconductor memory device comprising:

bit lines;

a first load circuit connected to said bit lines to charge them to a potential;

nonvolatile memory cells connected to said bit lines;

a first transfer gate transistor which is connected between said bit lines and a first node and whose gate is supplied with a preset bias voltage;

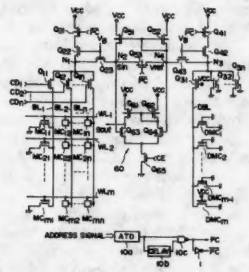
a second load circuit connected to said first node to charge the same;

at least one dummy bit line;

a third load circuit connected to said dummy bit line to charge the same;

dummy cells connected to said dummy bit line;

a second transfer gate transistor which is connected between



said dummy bit line and a second node and whose gate is supplied with the preset bias voltage;

a fourth load circuit having a current supplying ability higher than said second load circuit, connected to said second node to charge the same;

an equalizing circuit for equalizing potentials of said first and second nodes in a non-readout period in which stored data is not read out; and

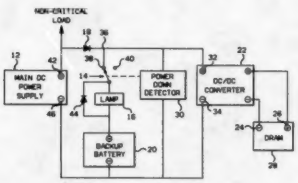
a sense amplifier for comparing the potential of said first node with that of said second node, and amplifying and supplying the difference therebetween in a data readout period, wherein substantially the same capacitance as that associated with said bit line is provided for said dummy bit line.

4,884,242

BACKUP POWER SYSTEM FOR DYNAMIC MEMORY

Robert H. Lacy, and William A. Spencer, both of Bartlesville, Okla., assignors to Applied Automation, Inc., Bartlesville, Okla.

Filed May 26, 1988, Ser. No. 199,980
Int. Cl.[4] G11C *11/40*
U.S. Cl. 365—229 **13 Claims**



1. Apparatus for continuously supplying DC power to a dynamic memory said apparatus comprising:

a DC/DC converter connected to said dynamic memory, wherein said DC/DC converter supplies regulated DC power to said dynamic memory to maintain a bit pattern stored in said dynamic memory;

a main DC power supply connected to said DC/DC converter, wherein said main DC power supply supplies input power to said DC/DC converter;

a backup DC power supply to backup the power supplied to said DC/DC converter by said main DC power supply;

a power down detector circuit for detecting when input power to said DC/DC converter is below a predetermined level, wherein an input power level for said DC/DC converter that is below said predetermined level prevents said DC/DC converter from supplying sufficient DC power to said dynamic memory to maintain said bit pattern stored in said dynamic memory;

means coupled to said power down detector circuit for immediately supplying backup power from said backup DC power supply when said input power from said main DC power supply is interrupted; and

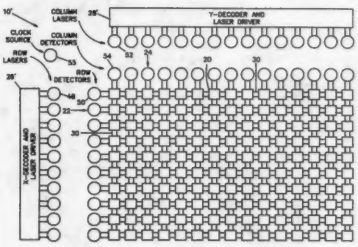
means for automatically disconnecting said backup DC power supply when the input power for said DC/DC converter falls below said predetermined level.

4,884,243

MULTI-PORT, OPTICALLY ADDRESSED RAM

Alan R. Johnston, La Canada; Robert H. Nixon, Sunland; Larry A. Bergman, Van Nuys, and Sadik Esener, La Jolla, all of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Feb. 19, 1988, Ser. No. 157,692
Int. Cl.[4] G11C *8/00*
U.S. Cl. 365—234 **31 Claims**



1. In a binary computer memory having a plurality of storage cells for containing bits of binary information and logic at a location removed from close proximity to the storage cells for receiving information from an outside source directing access to ones of the storage cells, the improvement comprising:

(a) first light source means associated with the logic for transmitting a first light beam with the access information modulated thereon;

(b) first light detecting means associated with the storage cells for receiving said first light beam, for generating an electrical signal containing the access information, and for conducting said electrical signal to one of the storage cells to which it is directed; and,

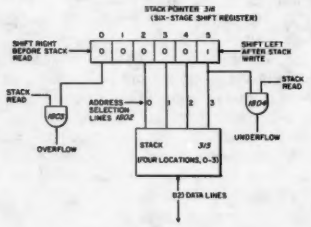
(c) reflecting means disposed between said first light source means and said first light detecting means for reflecting said first light beam from said first light source means to said first light detecting means.

4,884,244

METHOD OF ADDRESSING A COMPUTER MEMORY

Tony M. Brewer, Raleigh, N.C., assignor to Data General Corporation, Westboro, Mass.

Filed Jan. 28, 1985, Ser. No. 695,335
Int. Cl.[4] G11C *8/00*
U.S. Cl. 365—240 4 Claims



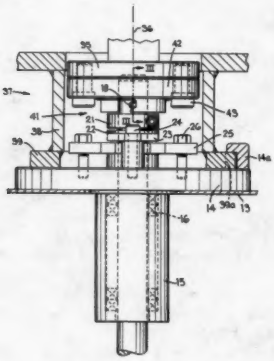
1. A storage system for use in a digital computer comprising:
storage means having n multibit storage locations for storing data in binary form;
shift register means having n stages for identifying locations in said storage means;
connect means coupled between said storage means and said shift register means for identifying each of said n stages of said shift register means with a corresponding location in said storage means;
selection means for selecting a next stage in said shift register means and for enabling a corresponding location in said storage means.

4,884,245

QUICK-CONNECTION DRIVE COUPLING FOR MIXING TANK

George C. McIntosh, Portsheldon Township, Ottawa County, and Robert Gowin, Grand Haven, both of Mich., assignors to JWI, Incorporated, Holland, Mich.

Filed Mar. 21, 1989, Ser. No. 326,629
Int. Cl.[4] B01F *7/16*
U.S. Cl. 366—279 7 Claims



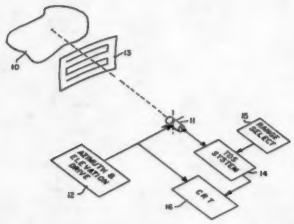
1. In combination, a closed tank containing a liquid therein, the tank having an interior mixing shaft which extends upwardly through a top wall of the tank and has a shaft extension which projects upwardly a predetermined extent above the top wall, the shaft extension having pinlike elements projecting radially outwardly from diametrically opposite sides thereof at a location close to but spaced axially downwardly a small distance from the upper free end of said shaft extension, and a drive unit for releasable attachment to the shaft extension to effect rotation of said mixing shaft, said drive unit comprising:
a motor section including a rotatable drive motor confined within a housing and having a drive member rotatable about an axis;
a sleeve-like shroud fixed to said housing and projecting axially thereof in concentric relationship to said axis, said shroud terminating in an axial free end defined by an annular end plate;
a drive coupling means disposed within said shroud for permitting quick drive connection to and disconnection from said shaft extension when said shroud is positioned in surrounding relationship to said shaft extension so that the annular end plate thereof bears against said top wall;
said drive coupling means including a driving member non-rotatably coupled to said drive member for rotation thereby about said axis, said driving member having a piloting bore formed coaxially thereof for accommodating an upper end part of said shaft extension;
said driving member having a pair of drive-projections which project axially downwardly in cantilevered fashion and are spaced radially outwardly on generally diametrically opposite sides of said axis and define a clearance space diametrically therebetween so as to accommodate said shaft extension, each of said driving projections extending circumferentially around said axis through an arcuate extent which is significantly less than 90 degrees and defining a lead face as viewed in the direction of rotation, said lead face being disposed generally within a plane which extends parallel to said axis, said lead face being adapted to drivingly abut one of the pinlike elements on the shaft extension, and each said driving projection adjacent a lower free end thereof having a ramplike cam part which projects circumferentially outwardly from said lead face in the direction of rotation, said ramplike cam part being adapted to circumferentially extend beneath the respective pinlike element to create an axial coupling of the drive unit to the tank; and
the circumferentially extending regions which extend between said driving projections constituting opened clearance spaces for permitting relative axial movement between the drive coupling means and the tank to permit either quick connection or disconnection therebetween.

4,884,246

METHOD AND APPARATUS FOR REFLECTION MODE IMAGING

Richard C. Heyser, Tujunga, and James A. Rooney, La Crescenta, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Continuation of Ser. No. 821,001, Jan. 22, 1986, abandoned. This application Mar. 29, 1988, Ser. No. 145,104
Int. Cl.[4] G03B *42/06*
U.S. Cl. 367—7 7 Claims



1. A method of reflection mode imaging of a property within a volume including the steps of scanning said volume with a raster scan about a center of rotation using a transmitter/-

receiver, generating a signal to be transmitted using a time-delay spectrometer for sweeping the signal to be transmitted in frequency as a function of time and receiving a reflected signal modulated in amplitude and phase shift by said volume as said signal is reflected, selecting a total range differential of said frequency sweep for said transmitter as a function of time, gating a range window on said receiver with selected range differentials as a function of time for all ranges of interest at successive raster scan positions, demodulating the phase and amplitude of received signals falling within said selected range differential to obtain signals representative of a characteristic of said property while varying said range window until said volume has been scanned at all ranges and synchronously scanning an imaging display in a manner corresponding with said raster scan to display variations of said characteristics on said display at selected ranges.

4,884,247

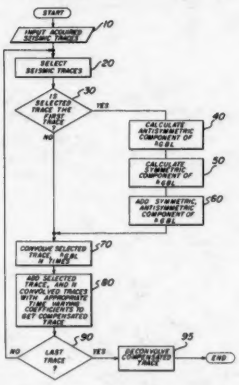
METHOD OF PROCESSING GEOPHYSICAL DATA TO COMPENSATE FOR EARTH FILTER ATTENUATION

Mohamed T. Hadidi, Dallas, Tex.; Andrejs Jurkevics, Arlington, Va., and Andrew F. Linville, Jr., Dallas, Tex., assignors to Mobil Oil Company, New York, N.Y.

Continuation-in-part of Ser. No. 23,313, Mar. 9, 1987, Pat. No. 4,780,859. This application Oct. 13, 1987, Ser. No. 107,717

Int. Cl.[4] G01V *1/36*

U.S. Cl. 367—43 **37 Claims**



1. A method of compensating for the effects of intrinsic and apparent attenuation of a seismic signal transmitted through a geophysical formation comprising the steps of:

determining an antisymmetric component of the cepstrum of an inverse earth filter;

determining a symmetric component of the cepstrum of said inverse earth filter modified to effect gain limiting;

combining said modified symmetric component and said antisymmetric compensated to determine said inverse earth filter of said geophysical formation; and

applying said inverse earth filter to said seismic signal to determine a compensated seismic signal.

4,884,248

METHOD OF RESTORING SEISMIC DATA

Stanley J. Laster; Robert A. Meek, both of Dallas, and Thomas E. Shirley, Richardson, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 148,307, Jan. 25, 1988. This application Jan. 30, 1989, Ser. No. 303,199

Int. Cl.[4] G01V *1/28, 1/36*

U.S. Cl. 367—73 **18 Claims**

1. A method of restoring seismic data to a null trace included as part of a series of seismic traces comprising steps of:

a single non-iterative procedure for a transform which band limits acquired data, by

producing a data localizing transform representation of said series of seismic traces;

applying a mute capable of passing only the localized data portion of said localized data transform space corresponding to said transformed series of seismic traces;

producing a second series of seismic traces from said muted transform, said second series of seismic traces including a partial restoration of said null trace;

substituting said partially restored trace for said null trace in said first series of seismic traces; and

producing a seismic section which includes a full restoration of said null trace from said substituted series of seismic traces.

4,884,249

MARINE STREAMER FOR USE IN SEISMIC SURVEYS

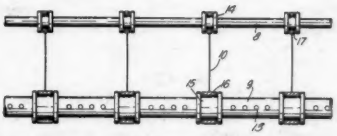
Clive T. Snook, Oegstgeest, Netherlands, assignor to GECO A.S., Sandvika, Norway

Filed Jul. 18, 1988, Ser. No. 220,675

Claims priority, application Norway, Jul. 27, 1987, 873149

Int. Cl.[4] G01J *1/00*

U.S. Cl. 367—154 **10 Claims**



1. A marine streamer for use in seismic exploration comprising:

a substantially tubular shaped and substantially flexible buoyancy member, having a buoyancy relative to water;

a streamer cable having a predetermined degree of negative

buoyancy for suspension below the surface of the water at a depth greater than said flexible buoyancy member;

a plurality of pairs of sleeve shaped swivel members mounted on said flexible buoyancy member and said streamer cable, one of the swivel members of each pair being mounted on said flexible buoyancy member and the other swivel member of each pair being mounted on said streamer, said pairs being in relative longitudinal spaced relationship;

ring members swivelly mounted around said sleeve shaped members; and

a narrow substantially resilient suspension rope connected to said ring members of each pair of swivel members for suspending said streamer cable from said flexible buoyancy member and maintaining said streamer cable at a predetermined distance from the surface of the water.

4,884,250

ACCELEROMETER FOR BLAST MONITORING

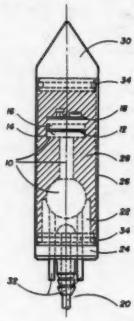
Frank Kitzinger, Montréal; David Sprott, Ile Bizard, and Michel Ménard, Pincourt, all of Canada, assignors to Noranda, Inc., Toronto, Canada

Filed Nov. 18, 1988, Ser. No. 272,945

Claims priority, application Canada, Jan. 29, 1988, 557778

Int. Cl.[4] H04R *17/00, 11/00*

U.S. Cl. 367—180 **6 Claims**



1. An accelerometer for blast monitoring comprising:

(a) At least one piezoelectric transducer having a piezoelectric membrane attached along an edge thereof to the sidewall of a container and having no extraneous mass secured thereto, said piezoelectric membrane being mounted for free movement in such container for generating a high impedance electrical output signal upon deformation of the piezoelectric membrane by its own inertia by vibration during a blast;

(b) a high to low impedance converter connected to said piezoelectric membrane for converting a high impedance output of said piezoelectric membrane into a low impedance signal for transmission through cables to electrical signal recording equipment; and

(c) means for encapsulating the piezoelectric transducer and converter into encapsulating material to minimize response to the transducer to surrounding acoustic signals.

4,884,251

HOUSING FOR A SONIC TRANSDUCER

James G. Moxness, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 26, 1982, Ser. No. 342,756

Int. Cl.[4] H04R *11/00*; A47B *81/06*; G01K *11/00*

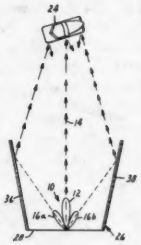
U.S. Cl. 367—188 **17 Claims**

1. A housing adapted for receiving a sonic transducer, said sonic transducer being capable of projecting and receiving a sonic pattern having a primary lobe in a primary direction and a secondary lobe over four quadrants, said secondary lobe being at a lobe angle to said primary lobe, comprising:

an end wall adapted for receiving said sonic transducer;

a restrictive wall coupled to said end wall, said restrictive wall for intercepting said secondary lobe in a first quadrant and reflecting said secondary lobe into a quadrant opposite said first quadrant; and

a pair of side walls coupled to said end wall and to said



restrictive wall, said pair of side walls substantially intercepting and reflecting said secondary lobe in quadrants adjacent said first quadrant to provide a more uniform sonic pattern i said quadrants adjacent said first quadrant to fill in said sonic pattern between said primary lobe and said secondary lobe in said quadrants adjacent said first quadrant;

said primary lobe of said sonic pattern being free of interception by said restrictive wall and said pair of side walls.

4,884,252

TIMEPIECE INCLUDING AN ANTENNA

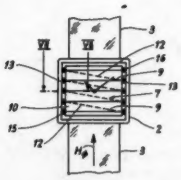
Viron Teodoridis, Hauterive, and Bernard Joss, Chézard, both of Switzerland, assignors to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland

Filed Apr. 14, 1989, Ser. No. 338,192

Claims priority, application Switzerland, Apr. 26, 1988, 1563/88

Int. Cl.[4] G04B *47/00*

U.S. Cl. 368—10 **9 Claims**



1. A timepiece adapted to be worn on a portion of the body having a cylindrical form such as the arm or the trunk, said timepiece including an antenna capable of capturing an electromagnetic field which includes a magnetic field H and an elec-

trical field E, said electromagnetic field bearing radio-diffused messages and a case having at least a glass and a back cover, said case comprising, in addition to the elements necessary to display the time of day, a micro receiver which receives the messages captured by the antenna in order to transform such messages into data perceptible to the wearer of the timepiece, the antenna being situated within the space bounded by the case and being constituted by a coil including at least one winding said winding being arranged and oriented to capture the component (H_ϕ) of the magnetic field tangential to said cylinder, the axis of said winding being arranged parallel to the back cover of the case.

4,884,253

BREAD MAKING DEVICE WITH A CLOCK FUNCTION

Seiji Koyabu, Nara, and Tatsuhisa Fukuda, Osaka, both of Japan, assignors to Sanyo Electric Co., Ltd. and Yamano Electric Mfg. Co., Ltd., both of Osaka, Japan

Filed May 18, 1988, Ser. No. 195,768

Claims priority, application Japan, Jun. 2, 1987, 62-138462; Jun. 16, 1987, 62-149383

Int. Cl.[4] G04B *47/00*; H05B *1/02*

U.S. Cl. 368—10 **5 Claims**

1. A bread making device provided with a clock function comprising:

a starter means for generating by the operation thereof a starting instruction,

a clock means for counting up present time,

a first memory means for memorizing a bread making time previously set for break making,

means for adding said bread making time to the present time counted by said clock means at the moment of input of said starting instruction so as to thereby obtain a bread making finishing time,

second memory means for memorizing said bread making finishing time,

a display selecting means for generating normally said present time supplied from said clock means and for generating said bread making finishing time supplied from said second memory means instead of present time in response to said starting instruction, and

a time display means for displaying a time generated by said display selecting means.

4,884,254

TIME DISPLAY DEVICE

Shoichi Kawai, Sangenya-nishi; Masayuki Konishi, Nara, and Chieji Katoh, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 27, 1988, Ser. No. 289,828

Claims priority, application Japan, Dec. 28, 1987, 62-200324

Int. Cl.[4] G04B *19/22*

U.S. Cl. 368—21 **5 Claims**

1. A time display device comprising:

input means having a variety of input keys and instruction keys;

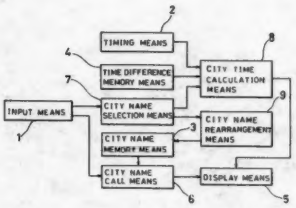
timing means for timing and outputting a standard time;

city name memory means for storing city names of three figures;

time difference memory means for storing the time difference of individual cities from the standard time;

display means for displaying various pieces of information;

city name call means for calling a predetermined number of the most recently called city names which are stored in said city name memory means when an instruction key for calling the city name is operated, and for displaying them in a listed form in said display means;



city name selection means for selecting a desired one from the listed city names when an instruction key for selecting the city name is operated;

city time calculation means for outputting the time of the selected city and outputting the time to said display means by calling the time difference of the selected city name, when selected, from said time difference memory means and by adding the called time difference to the standard time outputted from said timing means; and

city name rearrangement means for storing the selected city name as the first listed city of said city name memory means.

4,884,255

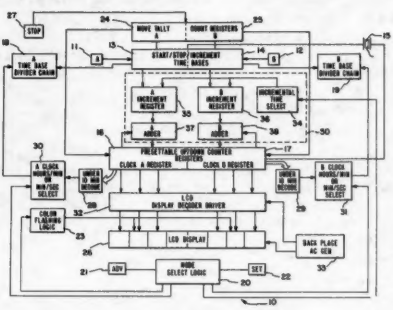
DIGITAL CHESS CLOCK

Robert J. Fischer, Box 50271, Pasadena, Calif. 91105

Filed Aug. 5, 1988, Ser. No. 228,610

Int. Cl.[4] G04F *3/00*

U.S. Cl. 368—96 **20 Claims**



1. A timing device for timing two events which comprises:

a pair of clock means for timing two different events; compensation means coupled to said clock means for incrementing or decrementing each of said clock means;

a pair of start switches coupled to said clock means, each of which starts one of said clock means for timing one event and simultaneously stops the other of said clock means to interrupt the timing of the other of the two different events;

at least one of said start switches also being coupled to said

compensation means for actuation of said compensation means; and

display means coupled to said clock means for displaying the time for each of the two different events.

4,884,256

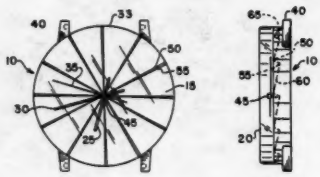
DIAL FACE FOR CLOCK OR WATCH

Bruce N. Blackburn, Pelham, N.Y., assignor to Bernard Weinstein, New York, N.Y.

Filed Oct. 20, 1988, Ser. No. 260,411

Int. Cl.[4] G04B *19/00*

U.S. Cl. 368—223 34 Claims



1. An apparatus for indicating time comprising:

(a) a face having stationary members positioned in adjacent relation at an angle with respect to a horizontal base plane and arranged in a predetermined pattern oriented around a central point, each said member comprising a first plane and a second plane which intersect to form a common edge therebetween, said first and second planes being of different areas and terminating in a first plane boundary and a second plane boundary, respectively, wherein the boundary of the first plane of one member contacts a portion of the boundary of the second plane of an adjacent member to form a continuous surface around said point; and

(b) means for determining elapsed time by viewing said surfaces.

4,884,257

WRIST WATCH

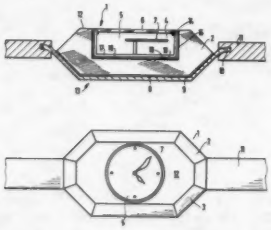
Helmut Swarovski, Wattens, Austria, assignor to D. Swarovski & Co., Wattens, Austria

Filed Mar. 17, 1989, Ser. No. 324,734

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1988, 3810001

Int. Cl.[4] G04B *37/00*

U.S. Cl. 368—276 3 Claims



1. A wrist watch having a case made of faceted glass that has a recess for taking up a watchwork, characterized in that the recess (4) is provided on the top (12) of the case (2) made of faceted glass, the underside (13) of the case (2) and the walls (15) and floor (16) of the recess (4) bear reflecting layers (8, 19) so as to reflect the rays of light incident upon the top (12), and the case (2) is disposed in a bottom portion (9) connected therewith.

4,884,258

MINIATURE TABLE CLOCK

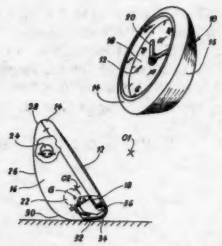
Pierre-André Noirjean, Courfaivre, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland

Filed May 5, 1989, Ser. No. 347,668

Claims priority, application Switzerland, May 10, 1988, 1772/88

Int. Cl.[4] G04B *37/12*

U.S. Cl. 368—276 5 Claims



1. A miniature table clock including a case provided with a front glass and a back cover in the form of a cap, an arrangement for displaying the time of day covered by the glass and positioning means defining two positions of stable equilibrium, a first position in which the case rests on its front face and a second position in which the case rests on the back cover, said back cover including a first zone defined by a first convex surface a portion of which serves to bear the clock in its second equilibrium position and a second zone defined by a second convex surface surrounding the first zone, the mean radius of curvature of the first surface being less than the mean radius of curvature of the second surface.

4,884,259

OPTICAL MEMORY DISK AND TRACK ACCESS THEREFOR

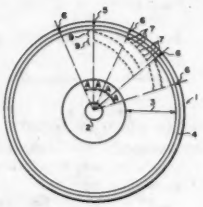
Hiroshi Horikawa; Yoshio Kudo; Daigo Ezuka, and Takashi Shoji, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Filed Aug. 28, 1985, Ser. No. 770,416

Claims priority, application Japan, Aug. 28, 1984, 59-179076; Aug. 31, 1984, 59-180311; Oct. 3, 1984, 59-206292

Int. Cl.[4] G11B *17/22*

U.S. Cl. 369—32 2 Claims



1. A tracking servo method for accurately tracking with an optical head a desired data track on a rotating optical memory disk having no tracking guide grooves but having concentrically arranged data tracks provided with sector marks characterized by the steps of producing an optical head position

signal corresponding to the position of the desired track, producing an eccentricity correction signal derived from an eccentricity detected in the rotating disk, producing a tracking error signal obtained when the sector mark is detected, summing said head position signal, said eccentricity correction signal and said tracking error signal, and adjusting the position of said head as a function of the summed signals.

4,884,260

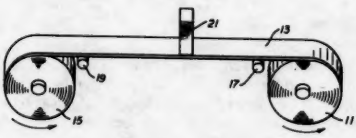
DATA RECORDING SYSTEM FOR OPTICAL MEMORY TAPE

Eric W. Bouldin, Atherton, and Jerome Drexler, Los Altos Hills, both of Calif., assignors to Drexler Technology Corporation, Mountain View, Calif.

Division of Ser. No. 39,507, Apr. 16, 1987, Pat. No. 4,753,864, which is a continuation-in-part of Ser. No. 935,999, Nov. 28, 1986, Pat. No. 4,788,129, which is a continuation-in-part of Ser. No. 896,988, Aug. 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 855,228, Apr. 23, 1986. This application Jun. 22, 1988, Ser. No. 210,527

Int. Cl.[4] G11B *7/007, 11/03, 25/06*

U.S. Cl. 369—93 7 Claims



1. A system for recording data by means of a laser comprising,

a pack of optical recording tape having a length wound on a spool, said tape having a flexible web backing, a reflective metallic layer deposited over said backing, and an optical storage layer with a planar crust of irregular, nonfilamentary and oblong black silver particles within the top one-half micron of the optical storage layer distal to the backing and substantially clear gelatin below the crust, the optical storage layer being laser recordable in place on said tape producing reflective data spots revealing the underlying reflectivity of the metallic layer against a background field of said crust, the optical reflective contrast ratio of the data spots to the surrounding field being at least 1.2 to one,

laser means having at least one beam disposed in laser writing relation with respect to said strip for writing data in a plurality of parallel tracks,

a light detector means disposed in reading relation with respect to said strip for reading said tracks, and

means providing relative motion between the laser beam and the tape for following said tracks.

4,884,261

STORAGE MEDIA TRANSDUCER LOADING/UNLOADING AND CARRIAGE LOCK MECHANISM

Warren L. Dalziel, Monte Sereno, Calif., assignor to Tandon Corporation, Moorpark, Calif.

Continuation-in-part of Ser. No. 759,900, Jul. 29, 1985, abandoned. This application Feb. 24, 1988, Ser. No. 159,709

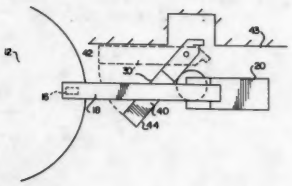
Int. Cl.[4] G11B *21/22*

U.S. Cl. 360—105 16 Claims

1. Apparatus for loading and unloading a magnetic transducer from a surface of a storage medium, the magnetic transducer being mounted on a cantilevered member coupled to a carriage, configured for motion across the surface of the storage medium, the carriage being movable along a carriage axis extending from the storage medium, comprising:

a separator, comprising a member of generally planar configuration having a selected width, configured to rotate about an axis of rotation associated therewith between a first and a second position, the axis of rotation being in a fixed location relative to the storage medium, the separator having a first surface at an oblique angle to the surface of the storage medium, contacting and displacing the cantilevered member when moved into the second position, a first separator surface parallel to the axis of rotation of said separator at an oblique angle to the generally planar configuration of the member comprising said separator, second and third separator surfaces parallel to the axis of rotation of said separator and at oblique angles to the generally planar configuration of the member comprising said separator, the second and third separator surfaces being perpendicular to each other;

a trigger, movable, responsive to an external command, between a trigger first position and trigger second position, and comprising a first trigger surface parallel to the axis of rotation of the separator at an oblique angle to the generally planar configuration of the member comprising the separator when said separator is in said first position, and in abutting contact with the first surface of said separator when said separator is in the first position and producing a force about said axis of rotation of said separator to lock the separator in the first position, and second and third trigger surfaces, parallel to the axis of rotation of said separator, said second and third trigger surfaces being parallel to the second and third separator surfaces, and in abutting contact therewith, responsive to said separator being in the second position and said trigger being in the trigger means first position to lock the separator in the second position; and



a spring, coupled between said trigger and a point displaced from the axis of rotation of said separator.

4,884,262

MAGNETIC SYSTEM FOR A STEREO PICK-UP WITH A MOVABLE COIL

Jan Larsen, Herlev; Robert Gudmandsen, Pr sto, and Per Winfeld, Lyngby, all of Denmark, assignors to Ortofon Manufacturing A/S, Valby, Denmark

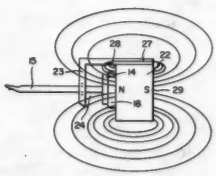
PCT No. PCT/DK86/00127, § 371 Date Jul. 17, 1987, § 102(e) Date Jul. 17, 1987, PCT Pub. No. WO87/03157, PCT Pub. Date May 21, 1987

PCT Filed Nov. 18, 1986, Ser. No. 78,524

Claims priority, application Denmark, Nov. 18, 1985, 5317/85

Int. Cl.[4] G11B *3/00*

U.S. Cl. 369—136 4 Claims



1. A magnet system for a stereo pick-up with a movable coil

and containing a permanent magnet with a high energy product, characterized in that the magnet system comprises an L- or a U-shaped yoke member of magnetically conductive or permanent-magnetic material, and that one leg of said yoke member is disposed in opposite and somewhat spaced as well as substantially parallel relationship with a pole face of the magnet, while the other leg or legs are disposed in engagement with or closely adjacent to one magnet side or their respective magnet sides parallel with the field direction.

4,884,263

PACKET-SWITCHED COMMUNICATIONS NETWORK WITH PARALLEL VIRTUAL CIRCUITS FOR RE-ROUTING MESSAGE PACKETS

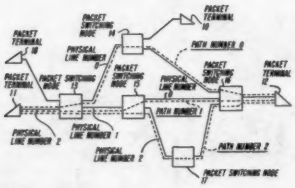
Hiroshi Suzuki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 1,443, Jan. 8, 1987, abandoned. This application Mar. 17, 1989, Ser. No. 325,010

Claims priority, application Japan, Jan. 9, 1986, 61-2442; Apr. 15, 1986, 61-85184

Int. Cl.[4] H04J *1/16*

U.S. Cl. 370—16 **7 Claims**



1. A packet-switched communications network, comprising:

a plurality of terminals each being capable of sequentially transmitting control packets in response to a request for a call and subsequently transmitting message packets in succession; and

a plurality of switching nodes connected to one or more of said terminals, each of said switching nodes having means responsive to said control packets for establishing first and second virtual circuits from a source terminal to a destination terminal, means for detecting whether an abnormal condition exists in said first virtual circuit, and means for writing routing information of said first virtual circuit into said message packets to enable same to be propagated through said first virtual circuit and rewriting said routing information of said message packets with routing information of said second virtual circuit when said abnormal condition is detected in said first logical channel.

4,884,264

HYBRID TIME MULTIPLEX SWITCHING SYSTEM WITH OPTIMIZED BUFFER MEMORY

Michel Servel, Lannion; Patrick Gonet, Trelevern, and Jo'-,uml/e/ l Francois, Perros Guirec, all of France, assignors to Etat Francais Represente Par Le Ministre Des PTT (Centre National D'Etudes Des Telecommunications, Issy-Les-Moulineaux, France

Filed Jul. 22, 1988, Ser. No. 223,692

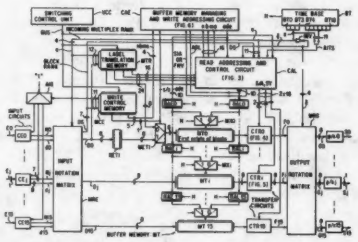
Claims priority, application France, Jul. 24, 1987, 87-10034

Int. Cl.[4] H04J *3/26*

U.S. Cl. 370—58.1 **9 Claims**

1. A system for switching data blocks between a plurality of incoming multiplex ways and a plurality of outgoing multiplex ways, each of said blocks in said incoming ways being intended for at least one addressee of said outgoing ways,

said system comprising input means (CE, MRE) for detecting data blocks in said incoming multiplex ways thereby multiplexing detected blocks into multiplexed blocks, buffer means comprising block cells for memorizing said multiplexed blocks, write addressing means (MCE, MTR, CPE) deriving write addresses of block cells for writing said multiplexed blocks in block cells in accordance with the derived write addresses, read addressing means (CAL) for arranging the addresses of the write addressed block cells dependent on addressee outgoing multiplex ways for which the written blocks are intended for cyclically reading the written blocks into read blocks in accordance with the arranged block cell addresses, and means (CTR, MRS,



p/s) for demultiplexing said read blocks and transmitting them onto said addressee outgoing multiplex ways,

said write addressing means comprising means (MAD) for selecting any one of the block cells which is free in said buffer means responsive to any data block being detected, thereby providing a free cell address to write said detected block in said buffer means, said free cell address being selected contingent on block cell addresses which are supplied from said read addressing means to said selecting means when memorized blocks are read.

4,884,265

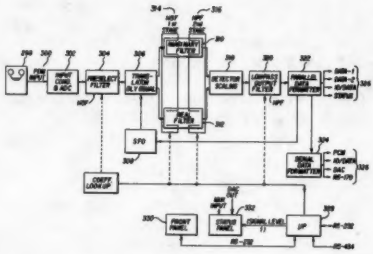
DIGITAL DEMODULATOR FOR FREQUENCY-DIVISION-MULTIPLEXED SIGNALS

Gene F. Schroeder, and Guy T. Ellis, Jr., both of Sarasota, Fla., assignors to Loral Corporation, Syosset, N.Y.

Filed Apr. 30, 1987, Ser. No. 44,424

Int. Cl.[4] H04J *1/02*

U.S. Cl. 370—70 **34 Claims**



1. Apparatus for demodulating a frequency-division-multiplexed input signal having modulating information and one or more subcarrier channels, comprising:

input means for receiving said input signal,

analog-to-digital conversion means in communication with said input means for providing a series of digital words corresponding to the instantaneous amplitude of said input signal,

translation means in communication with said analog-to-digital means for removing the subcarrier of each of said subcarrier channels of said input signal and producing

translated signals, and for providing real and imaginary components of said translated signals encoding phase information corresponding to the modulating information in the input signal for each of said subcarrier channels,

low-pass filter means in communication with said translation means for selecting out the real and imaginary components of each of said translated signals, and

demodulating means in communication with said low-pass filter means for recovering modulation of said translated signals, wherein said demodulating means comprises means for analyzing said phase information.

4,884,266

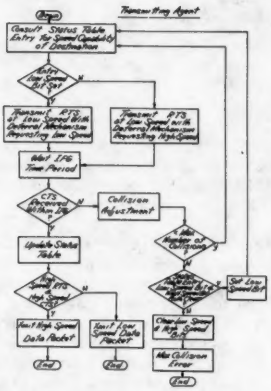
VARIABLE SPEED LOCAL AREA NETWORK

Michael W. Pflaumer, Berkeley, Calif., assignor to Sun Microsystems, Inc., Mountain View, Calif.

Filed Aug. 9, 1988, Ser. No. 230,180

Int. Cl.[4] H04J 3/22

U.S. Cl. 370—84 **46 Claims**



1. A method for transferring data on a communication medium between a plurality of data processing devices ("agents"), including a sending agent and a receiving agent, comprising the steps of:

said sending agent transmitting a first signal(RTS) to said receiving agent coupled to said data communication medium at a first speed;

said receiving agent receiving said first signal and generating a second signal(CTS), said second signal including an CTS control character corresponding to a speed for data transfer over said medium, said receiving agent transmitting said control signal on said medium to said sending agent;

said sending agent receiving said second signal and transmitting a data packet to said receiving agent at the speed which corresponds to said CTS control character;

whereby data is transfer between said sending and receiving agents coupled to said communication medium.

4,884,267

TDM TRANSMISSION SYSTEM

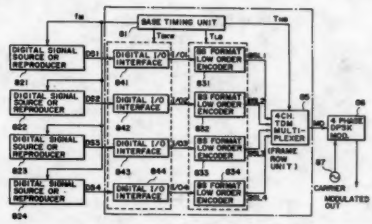
Yukihiko Miyamoto, Tama; Hirokazu Kobayashi, Gyoda, and Syoichi Suzuki, Tokyo, all of Japan, assignors to Kabushiki Kaisha Kenwood, Tokyo, Japan

Filed May 28, 1987, Ser. No. 55,073

Claims priority, application Japan, Dec. 27, 1986, 61-309090; Dec. 27, 1986, 61-309091; Feb. 24, 1987, 62-24939[U]

Int. Cl.[4] H04J 3/06

U.S. Cl. 370—100.1 **7 Claims**



1. A time division multiplex system comprising:

time division multiplex transmitter means which comprises;

a base timing unit for supplying a master clock to a plurality of PCM digital signal sources having a same sampling frequency and a same quantization bit number to effect frequency synchronization;

a digital I/O interface unit for adjusting the phase of each sample data word not D/A converted and sampled from said digital signal source;

a low order encoder unit for obtaining a low order encoder output of a predetermined format at a same timing from said base timing unit, based on said data word signal phase-adjusted by said digital I/O interface unit; and

a time division multiplex unit for obtaining a time-divisionally multiplexed signal by time-divisionally multiplexing said low order encoder output in units of frame row: and

time division demultiplex receiver means which comprises;

a time division demultiplex unit for demultiplexing said time-divisionally multiplexed signal in units of frame row and outputting a low order signal having a predetermined format expanded in accordance with an original transmission rate; and

a low order decoder unit inputted with said low order signal of a predetermined format and decoding the sampled data word signal.

4,884,268

REPEATER ARRANGEMENT CAPABLE OF AVOIDING ACCUMULATION OF STUFF JITTERS

Kunihiro Goto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 269,026

Claims priority, application Japan, Nov. 9, 1987, 62-281075

Int. Cl.[4] H04J 3/07

U.S. Cl. 370—102 **2 Claims**

2. A repeater arrangement for dealing with a sequence of input multiplexed signals to produce a sequence of output multiplexed signals, each of said input and said output multiplexed signals comprising at least one of stuff pulses within every one of multiframes of said each multiplexed signal and a plurality of data signals distributed to a plurality of channels, said repeater arrangement comprising:

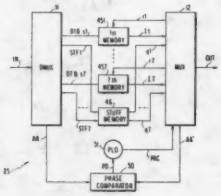
a demultiplexer for demultiplexing said input multiplexed signals into a plurality of demultiplexed signals assigned to the respective channels;

first memory means coupled to said demultiplexer for memorizing said demultiplexed signals with the stuff pulses

destuffed to produce reproduced demultiplexed signals in accordance with readout clock pulse sequences;

second memory means coupled to said demultiplexer for memorizing stuff information related to the stuff pulses destuffed;

means coupled to said first and said second memory means for delivering a plurality of clock pulse sequences to said



first memory means with reference to said stuff information as said readout clock pulse sequences, each of said clock pulse sequences appearing at time positions assigned to said stuff pulses; and

means for multiplexing said reproduced demultiplexed signals into said output multiplexed signal sequence with the stuff pulses added.

4,884,269

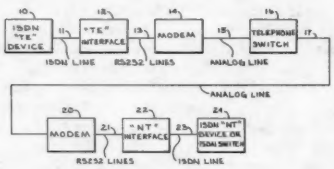
METHOD AND APPARATUS FOR CONNECTING ISDN DEVICES OVER AN ANALOG TELEPHONE LINE

Jay P. Duncanson, San Francisco, and Stephen J. Speckenbach, Oakland, both of Calif., assignors to Hayes Microcomputer Products, Inc., Norcross, Ga.

Filed Jun. 20, 1988, Ser. No. 209,348

Int. Cl.[4] H04J *3/12, 3/17*

U.S. Cl. 370—110.1 **17 Claims**



1. An apparatus for allowing a first ISDN device to communicate with a second ISDN over an analog telephone line, comprising:

first interface means connected to said first ISDN device, said first interface means comprising means for receiving ISDN data signals from said first ISDN device, and means for separating selected data for a selected ISDN channel from said ISDN data;

first means for determining whether said selected data for said selected ISDN channel represents a data condition or an idle signal condition;

means for deleting said selected data which represents said idle signal condition;

a first modem for receiving said selected data and placing a modulated signal onto said analog telephone line, said modulated signal corresponding to said selected data;

a second modem for receiving said modulated signal from said analog telephone line, and demodulating said modulated signal to provide demodulated data corresponding to said modulated signal;

second means for determining whether said demodulated data represents a data condition or an idle signal condition;

means for inserting a predetermined number of bytes of a predetermined value into said demodulated data if said demodulated data represents said idle signal condition;

means for assembling said demodulated data into packets having a predetermined size; and

second interface means, said second interface means comprising means for receiving said packets, means for incorporating said packets into a selected ISDN channel of an ISDN data stream, and means for providing said ISDN data stream to said second ISDN device.

4,884,270

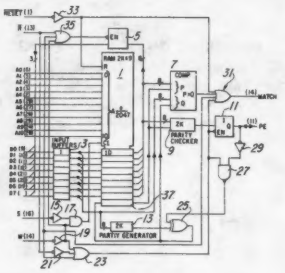
EASILY CASCADABLE AND TESTABLE CACHE MEMORY

Edison H. Chiu, Richardson, and Roland H. Pang, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 940,369, Dec. 11, 1986, Pat. No. 4,831,625. This application Oct. 14, 1988, Ser. No. 257,500

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—21.2 **12 Claims**



1. A single semiconductor chip cache memory comprising:

(a) a SRAM having plural data inputs, plural address inputs, plural address locations for storing data and plural data outputs;

(b) a comparator for comparing said data inputs stored at said addressed locations to provide a comparator output indicative of a match between input and stored data; and

(c) an output transistor having three electrodes including first and second electrodes and a control electrode for selectively coupling together the first and second electrodes, said control electrode being coupled to the comparator output to control the coupling or uncoupling of the first and second terminals in response to the comparator output at the control terminal.

4,884,271

ERROR CHECKING AND CORRECTING FOR READ-MODIFIED-WRITE OPERATIONS

Fernando Concha, and Charles J. Stancil, both of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 28, 1987, Ser. No. 138,429

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—40.2 **4 Claims**

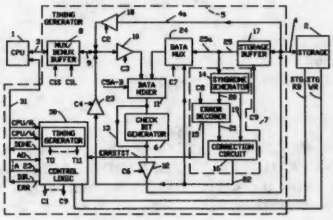
1. In a data processing system including a data storage module having a plurality of addressable locations for storing in each said location a digital information segment and an error checking and correcting code (ECC) for said segment and including a processor operating upon information in units smaller than said segment, said system further including read-modify-write (RMW) means for combining a portion of a selected segment with an information unit from the processor

to form a new segment and its ECC for transfer to the storage module,

the method of transferring information units from the processor to the storage module comprising the steps of concurrently

(a) combining a portion of a selected first segment from one of said locations with an information unit from the processor to form a second segment and generating ECC bits for said second segment, and

(b) writing said second segment to said one location;



(c) determining whether the selected first segment is error free or contains a single bit error;

correcting the selected first segment, if it contains a single bit error, to form a third segment; combining a portion of the corrected third segment with the information unit from the processor to form a fourth segment and generating ECC bits for said fourth segment; and

rewriting the fourth segment in place of said second segment in said one location.

4,884,272

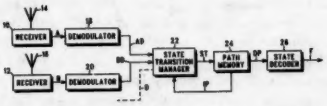
MAXIMUM LIKELIHOOD DIVERSITY RECEIVER

Peter R. H. McConnell, 5970 Empress Ave., Burnaby, British Columbia, Canada (V5E 2S2)

Filed Feb. 10, 1988, Ser. No. 154,218

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—43 **2 Claims**



2. A maximum likelihood diversity receiver comprising at least two receivers at a common receiving site, each said receiver having its own antenna, said antennas being separated to receive signals having a low correlation coefficient, each said receiver generating a demodulated signal, including in combination:

a state transition manager for applying Hamming weight to said demodulated signals generated by each receiver for all possible state transition paths across each level in a trellis based on a known starting state,

means for determining a minimum Hamming weight of each state transition path across a level in said trellis,

means for retaining only the minimum Hamming weight for each said path regardless of the receiver source,

path memory means for accumulating minimum Hamming weights for each level in said trellis into a metric for each path until a pair of paths intersect,

means for selecting the moth likely path to said intersection based on the one of said intersecting paths having the metric with the minimum Hamming weight and discarding the other path leading to the intersection and

means for repeating the process until only a single path remains and state decoder means for decoding said received signal to determine a message based on a remaining single path in said state decoder means.

4,884,273

METHOD AND APPARATUS FOR MONITORING THE CONSISTENCY OF SUCCESSIVE BINARY CODE SIGNAL GROUPS IN DATA PROCESSING EQUIPMENT

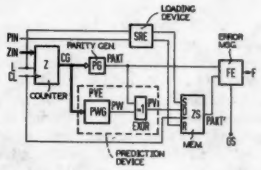
Friedhelm Caprasse, Zorneding, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 25, 1988, Ser. No. 147,723

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1987, 3703184

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—49.4 **4 Claims**



1. A method for monitoring the consistency of successive binary code signal groups, including binary numbers of a prescribed length used as addresses in data processing equipment, comprising the steps of

comparing the current parity bit to the parity bit predictively calculated for the current code signal group in response to the predeccessor code signal group, and intermediately stored,

generating an error signal in the case of inequality,

generating an indicator signal (PW_1) indicating a possible change in parity bit upon transition to the successor code signal group ($CG_{x\pm1}$) for every effective code signal group (CG_x) according to the relationship

$$PW_i = 2^0 v \bigcup_{n=0}^{n=|(i-3)/2|} \left[\left(\begin{matrix} m=n \\ \cap \ 2^{2m+1} \\ m=0 \end{matrix} \right) \cap 2^{2(n+1)} \right] \text{for } i > 2$$

for code signal groups (CG_x, CG_{x+1}) following one another in ascending order, and according to the relationship

$$PW_i = 2^0 v \bigcup_{n=0}^{n=|(i-3)/2|} \left[\left(\begin{matrix} m=n \\ \cap \ 2^{2m+1} \\ m=0 \end{matrix} \right) \cap 2^{2(n+1)} \right] \text{for } i > 2$$

for code signal groups (CG_x, CG_{x-1}) following one another in descending order, said indicator signal being derived from the bit position signals ($2^{n=1}$, 2^2, . . . , $2^1 2^0$) of the respectively effective code signal group (CG_x); and

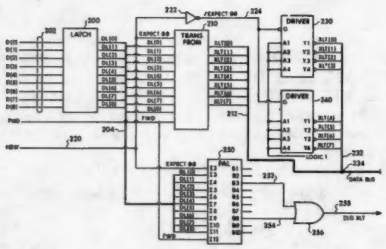
predictively calculating the parity bit (PV) belonging to the successor code signal group ($CG_{x\pm1}$) from the respectively calculated indicator signal (PW_1) together with the current parity bit (PAKT) respectively calculated from the effective code signal group (CG_x), by an exclusive-OR operation.

4,884,274

DETECTION OF NON-ZERO ERRORS IN THE PREFIX AND COMPLETION FRAMES OF HIGH DENSITY MAGNETIC TAPES AND APPARATUS THEREFOR

Howard H. Rather, Boulder, Colo., assignor to Aspen Peripherals Corp., Longmont, Colo.

Filed Apr. 19, 1988, Ser. No. 183,149
Int. Cl.[4] G06F *11/10*
U.S. Cl. 371—57.2 **4 Claims**



1. An apparatus for correcting the presence of non-zero errors in high density magnetic storage tape, said high density magnetic storage tape having prefix and completion frames, each of said prefix and completion frames having a plurality of tracks wherein each said track has byte fields set to all zeroes, each said track and each said byte field having an identity and whereas said prefix frames are frame counts one and two when said tape is read in the forward direction and wherein said completion frames are frame counts one and two when said tape is read in the reverse direction, said apparatus comprising:

means receptive of each of said byte fields for each of said plurality of tracks in said frame counts one and two of said prefix and completion frames for determining whether each said byte field contains a non-zero error,

means connected to said determining means for storing the identity of the track containing said non-zero byte field and the identity of the frame, and

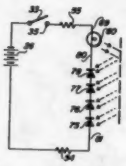
means receptive of each of said byte fields for each of said plurality of tracks in said frame counts one or two of said prefix and completion frames for setting all said byte fields to zero so that any non-zero errors contained therein are corrected.

4,884,275

LASER SAFETY SHUTOFF SYSTEM

Robert A. Simms, Phoenix, Ariz., assignor to Murasa International, Long Beach, Calif.

Filed Oct. 24, 1988, Ser. No. 261,103
Int. Cl.[4] H01S *3/10*
U.S. Cl. 372—9 **17 Claims**



1. A laser illuminator including in combination:

a housing having a light exit opening therein;

a laser light source mounted in said housing;

a power supply located in said housing;

control switch means for selectively interconnecting and disconnecting said laser light source and said power supply; a transmitting lens mounted in said housing between said light source and the light exit opening in said housing: a receiving lens concentrically mounted with respect to said transmitting lens in said housing adjacent said transmitting lens for receiving light of a predetermined wavelength: an opaque shield between said transmitting lens and said receiving lens to prevent light emitted from said light source from directly impinging upon said receiving lens and

normally closed, light responsive, safety switch means mounted in said housing behind said receiving lens means to receive light reflected from said light source onto said receiving lens means by an object and connected in series circuit with said light source and said power supply for opening said series circuit in response to light of a predetermined intensity impinging thereon.

4,884,276

OPTICAL FEEDBACK CONTROL IN THE FREQUENCY CONVERSION OF LASER DIODE RADIATION

George J. Dixon, Lutz, Fla.; Douglas W. Anthon, and John H. Clark, both of Wheaton, Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 125,161, Nov. 25, 1987, which is a continuation-in-part of Ser. No. 78,373, Jul. 27, 1984. This application Oct. 20, 1988, Ser. No. 260,255
Int. Cl.[4] H01S *3/10*
U.S. Cl. 372—21 **21 Claims**

1. An apparatus for generating coherent optical radiation which comprises:

(a) laser diode means for generating coherent optical radiation of a first frequency;

(b) an optical cavity which is resonant for optical radiation of said first frequency and separate from any optical cavity used as a component of said laser diode means;

(c) means for introducing said radiation of a first frequency from the laser diode means into said optical cavity;

(d) feedback means for returning a minor portion of said radiation of a first frequency from said optical cavity to the laser diode means, wherein said minor portion is effective to narrow the linewidth of the optical output from said laser diode means and to lock the optical output from said laser diode means at said first frequency; and

(e) nonlinear optical means disposed within said optical cavity for interacting with said radiation of a first frequency to generate coherent radiation of a second frequency.

4,884,277

FREQUENCY CONVERSION OF OPTICAL RADIATION

Douglas A. Anthon, Wheaton, and Donald L. Sipes, Jr., Lisle, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 157,741, Feb. 18, 1988. This application Jun. 16, 1988, Ser. No. 207,666
Int. Cl.[4] H01S *3/10*
U.S. Cl. 372—22 **36 Claims**

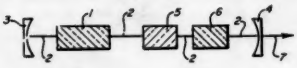
13. An apparatus for generating coherent optical radiation which comprises:

(a) an optical cavity for optical radiation of a first frequency;

(b) lasant material disposed within said cavity for generating optical radiation of said first frequency; and

(c) nonlinear optical means for converting said optical radiation of a first frequency into optical radiation of a second

frequency wherein said nonlinear optical means comprises at least two nonlinear optical crystals which are positioned within said optical cavity and oriented so that



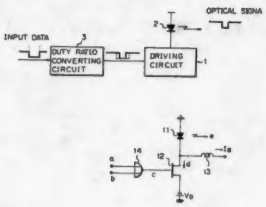
radiation of said first frequency circulating within the optical cavity can interact with said crystals along a phase-match axis of each crystal for said radiation of a first and second frequency.

4,884,278

SEMICONDUCTOR LASER MODULATION CONTROL SYSTEM

Hiroshi Nishimoto, Sagamihara; Takashi Touge, Tokyo; Tadashi Okiyama, Yokohama; Naoki Kuwata, Yokohama, and Yasunari Arai, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 234,082, Aug. 19, 1988, abandoned.
This application Mar. 6, 1989, Ser. No. 320,864
Claims priority, application Japan, Aug. 19, 1987, 62-204205
Int. Cl.[4] H01S *3/10, 3/00*
U.S. Cl. 372—26 **17 Claims**



1. A semiconductor laser modulation control system comprising:

a drive circuit (1) for supplying a drive current to a semiconductor laser (2) in accordance with an input data, to modulate said input data into an optical signal of said semiconductor laser (2), said optical signal being at either one of a high intensity state and a low intensity state in accordance with whether said input data is "1" and "0" in respective time slots of said input data; and

a duty ratio conversion circuit (3) receiving said input data and having an output connected to an input of said drive circuit (1), for converting the duty ratio of said input data in such a way that said low intensity state of said optical signal is returned to said high intensity state within each time slot of said input data.

4,884,279

OPTICAL TRANSMISSION APPARATUS

Yuichi Odagiri, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Apr. 22, 1988, Ser. No. 185,023
Claims priority, application Japan, Apr. 23, 1987, 62-98563
Int. Cl.[4] H01S *3/13*
U.S. Cl. 372—29 **19 Claims**

1. An optical transmission apparatus comprising:

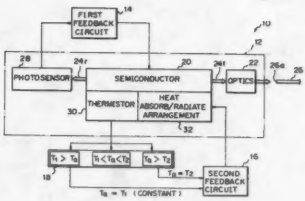
light emitting means for outputting coherent light;

output light control means including a first feedback circuit and a photosensor for stabilizing the light output by said light emitting means by sensing a part of said light;

temperature sensor means for sensing an ambient temperature

temperature control means including a second feedback circuit and a heat transfer means, said temperature control means being responsive to said ambient temperature sensed by said temperature sensor means for controlling the temperature of said light emitting means; and

decision means for determining whether the temperature



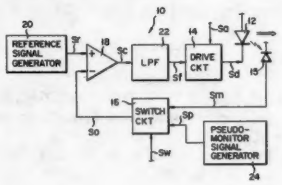
sensed by said temperature sensor means lies in a predetermined temperature range and for determining which one of said light control means or temperature control means should have priority; said decision means further identifying any one of three different stages to which the temperature of the light emitting means belongs such that information from said decision means is fed to at least one of the first and second feedback circuits to stabilize the output of the light emitting means.

4,884,280

SEMICONDUCTOR LASER DRIVING DEVICE FOR STABILIZING THE OPTICAL OUTPUT THEREOF

Osamu Kinoshita, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 23, 1988, Ser. No. 248,112
Claims priority, application Japan, Sep. 25, 1987, 62-241410
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—38 **10 Claims**



1. A device for stabilizing an optical output level of a semiconductor laser, said device comprising:

driver means for supplying a drive current to the laser;

light sensitive means for producing an electrical monitor signal indicative of the actual optical output level of said laser;

comparator means, connected to said light sensitive means, for receiving and electrical reference signal indicative of a reference output level of said laser, and for detecting a difference between values of the monitor signal and the reference signal to produce an electrical comparison signal indicative of a change in the actual optical output level of said laser; and

compensator means connected to said comparator means, for, when said laser is switched from a waiting mode to a normal oscillation mode for sending data, supplying said comparator means with an electrical compensation signal which serves to cause said comparator means to generate a certain comparison output having an amplitude low enough to set a current component supplied as the drive

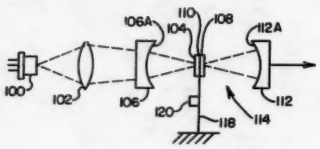
current to said laser to be forcibly decreased so that an abnormal current is eliminated from flowing in said laser.

4,884,281

LOW COST/POWER VISIBLE LIGHT SOLID-STATE LASER

Pliny S. Hawthorn, New Carlisle, and Mark D. Sobottke, Kettering, both of Ohio, assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Sep. 9, 1988, Ser. No. 242,792
Int. Cl.[4] H01S 3/091
U.S. Cl. 372—75 **18 Claims**



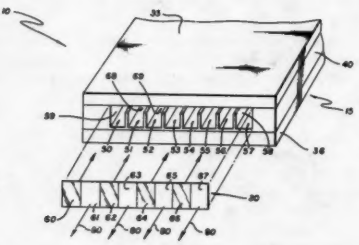
1. A compact, laser diode pumped, high efficiency, solid-state laser comprising:
a laser diode;
output coupler means including a mirrored surface forming a front end of a laser cavity;
input mirror means for forming a back end of said laser cavity;
a laser chip of stoichiometric lasing material;
a frequency doubler chip positioned immediately adjacent said laser chip for doubling the frequency of light generated by said laser chip thereby halving its wavelength;
coupling material for bonding said laser chip to said doubler chip, said coupling material having a refractive index matched to said chips to nearly eliminate reflections at power peaking means for generating spikes in laser light which passes through said output coupler means; and support means for movably mounting the bonded combination of said laser chip and said doubler chip, and wherein said power peaking means includes vibratory means for moving said support means and thereby the bonded combination of said laser chip and said doubler chip.

4,884,282

COUPLED WAVEGUIDE LASER ARRAY

William B. Bridges, Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Jun. 27, 1968, Ser. No. 211,886
Int. Cl.[4] H01S 3/082, 3/03
U.S. Cl. 372—97 **6 Claims**



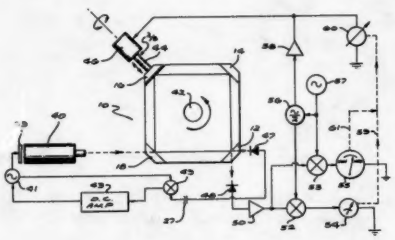
1. A coupled waveguide gas laser array comprising:
first and second electrodes;
first laser means disposed between said first and second electrodes for providing a first cavity along a first longitudinal axis and an output aperture at a first end thereof for providing a first beam in a first direction;
second laser means disposed between said first and second electrodes for providing a second cavity along a second longitudinal axis substantially parallel to said first longitudinal axis, said second means having an output aperture at a first end thereof to provide a second beam in said first direction;
an active medium disposed within said first and second cavities;
means for coupling said first cavity to said second cavity; and
a mirror mounted in a plane transverse to said longitudinal axes having
a first partially transmissive section mounted in optical alignment with said first beam and
a second substantially reflective section mounted in optical alignment with said second beam.

4,884,283

RING LASER GYROSCOPE MIRROR ORIENTATION SYSTEM AND METHOD

John Rahn, Canoga Park, and Thomas J. Hutchings, West Hills, both of Calif., assignors to Litton Systems, Inc., Beverly Hills, Calif.

Filed Dec. 20, 1988, Ser. No. 287,131
Int. Cl.[4] H01S 3/08
U.S. Cl. 372—107 **9 Claims**

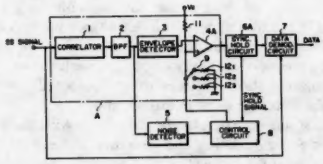


1. In a ring laser gyroscope, having a frame, and a closed optical path formed by a plurality of reflecting mirrors;
a method of orientation for at least one of said mirrors in order to provide a lower scatter and optimum cavity finesse, comprising the steps of:
(a) rotationally oscillating, at least one of each of a plurality of mirrors positioned away from said ring laser gyroscope frame along an axis of rotation which is parallel to a normal of said mirror;
(b) measuring a resonant output light beam emitted from said closed optical path to determine a speckle pattern intensity of said beam at a reflection point on a reflecting surface of said rotationally oscillating mirror;
(c) positioning said rotationally oscillating mirror securely onto a corner of said frame when said speckle pattern from said mirror has reached a minimum optical intensity;
repeating steps (a) through (c) above for each remaining mirror one at a time until each mirror along said optical path is secured to said frame at a reflecting point such that the overall scatter is optimized;
whereby, proper orientation of each of the mirrors along said closed optical pathway will be achieved.

4,884,284
SPREAD SPECTRUM RECEIVER

Shigeyuki Nakayama, Koganei, Japan, assignor to Kabushiki Kaisha Kenwood, Tokyo, Japan

Filed Sep. 22, 1988, Ser. No. 247,607
Claims priority, application Japan, Sep. 26, 1987, 62-239977
Int. Cl.[4] H04K *1/04;* H04L *9/00*
U.S. Cl. 375—1 2 Claims



1. A receiver in a spread spectrum communication system comprising:

an initial synchronization circuit including a correlator for detecting a correlation of the spread spectrum input signal, a detector circuit for detecting an output of said correlator, and a comparator for receiving an output of said detector circuit an outputting a correlation detection signal;

a synchronization holding circuit for receiving the correlation detection signal to perform synchronization holding and outputting a synchronization holding signal during the synchronization holding;

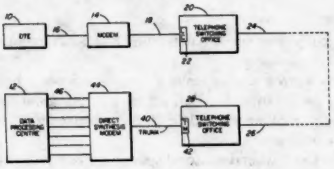
noise detecting means for detecting noises of the correlation detection signal;

and a control circuit for detecting if the synchronization holding signal is outputted within a predetermined period, and if not, controlling a reference voltage to be supplied to said comparator in accordance with the noise detection output of said noise detecting means.

4,884,285
(DS) TRANSMITTER

Jan Heynen, 2928 Haughton Street, Ottawa, Ontario, Canada (K2B 6Z7); Larry S. Kayser, 36 Glebe Avenue, Ottawa, Ontario, Canada (K1S 2C1), and Georges E. Mony, 3576 Marlowe Avenue, Montreal, Quebec, Canada H5A 3L7

Filed Feb. 12, 1987, Ser. No. 14,035
Claims priority, application Canada, Oct. 22, 1986, 521080
Int. Cl.[4] H04B *14/04*
U.S. Cl. 375—25 18 Claims

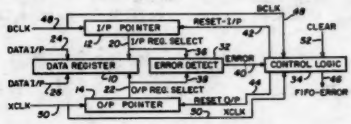


1. A method of transferring data from a telephone switching office to a remote processing center at a customer's premises via a telephone trunk, the data being multiplexed in a digitally encoded modulated format and carried on the telephone trunk to the processing center and vice versa comprising directly synthesizing at the customer's premises, from the digitally encoded modulated data multiplexed on the trunk, a plurality of digital data signals in a non-modulated format readable by the processing center and directly synthesizing at the customer's premises, a plurality of non-modulated digital data signals output from the processing center, data which is multiplexed in a digitally encoded modulated format for transmission on the trunk.

4,884,286
ELASTIC BUFFER FOR LOCAL AREA NETWORKS

Andre Szdzepanek, Bedford, and George Buchanan, Sherington, both of England, assignors to Texas Instruments Inc., Dallas, Tex.

Filed Dec. 12, 1985, Ser. No. 808,149
Int. Cl.[4] H04L *7/00*
U.S. Cl. 375—118 11 Claims



1. An elastic buffer for absorbing frequency jitter or drift of a data stream incoming on an input data line, comprising:

a serial circular stack of data register cells;

means for storing data bits in said cells from an incoming data stream one at a time with each bit in a cell adjacent a cell in which is stored a next earlier bit at a clock frequency BCLK equal to the frequency of arrival of the incoming data;

means for directing stored data from said data registers onto an output data line one at a time at a predetermined fixed clock rate XCLK equal to the average frequency of incoming data;

wherein at any instant the register from which data is taken out is a number of registers away from the register into which data is stored, the number increasing when the frequency of BCLK is greater than that of XCLK and decreasing when the frequency of BCLK is less than that of XCLK;

wherein said directing means includes:

a plurality of output gates each coupled between the output data line and an output of a corresponding one of said data registers;

an output pointer circuit selectively coupled to each of said output gates, in turn, at a frequency equal to said average frequency and operable when so coupled to release data from a corresponding one of said data registers onto the data output line; a plurality of input gates each coupled between

the input data line and an input of a corresponding one of said data registers; an input pointer circuit selectively coupled to

each of said input gates, in turn, at a frequency equal to the frequency of arrival of the input data and operable when so coupled to open a corresponding input gate and allow transmission of data from said line onto a corresponding data register; wherein said input and output pointers each

include a plurality of latches, one corresponding to each cell of said data registers, wherein all latches except a selected latch reset to a zero bit while the selected latch resets to a "1" bit and in response to incoming clock signals after each cycle each latch passes its bit level onto a next adjacent latch wherein a "1" level in a given latch causes a control signal to issue to an associated one of the input and output gates of a corresponding data register cell to open the gate and permit a data bit to flow thereby; and

wherein said data register cells each include an ERDET line precharged to a predetermined voltage level, normally non-transmitting gate means connecting said ERDET line to ground, said gate means responsive to a coincident signal from an output pointer

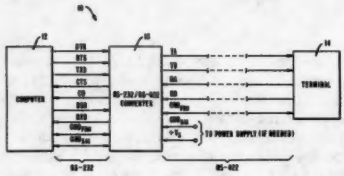
latch corresponding to said each cell and from an immediately preceding input pointer latch, and from an input pointer latch corresponding to said each cell and a coincident signal from an immediately preceding output pointer latch to open and ground said ERDET line.

4,884,287

CONVERTER DEVICE FOR INTERCONNECTING SYSTEMS HAVING DIFFERENT COMMUNICATION STANDARDS

Ronald Jones, Casselberry, and Michael E. Amy, Winter Springs, both of Fla., assignors to NCR Corporation, Dayton, Ohio

Filed Apr. 1, 1988, Ser. No. 176,508
Int. Cl.[4] H04L *23/00*
U.S. Cl. 375—121 **17 Claims**



1. In a converter device for interconnecting a first data processing system having input/output (I/O) signals conforming to a first communication standard, to a second data processing system having I/O signals conforming to a second communication standard, the improvement comprising:

deriving means for deriving an operating voltage for the converter device from at least one of the I/O signals of one of the first and second data processing systems; and

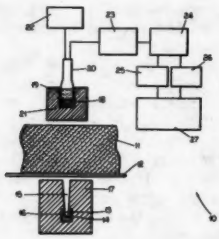
external voltage connection means for connecting the converter device to an external power source for receiving an external power signal from which an operating voltage may be derived, so that an operating voltage for the converter device may be derived from either the one I/O signal or the external power signal.

4,884,288

NEUTRON AND GAMMA-RAY MOISTURE ASSAY

Brian D. Sowerby, Kareela, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Campbell, Australia

Filed Dec. 29, 1986, Ser. No. 946,966
Claims priority, application Australia, Dec. 31, 1985, PH4049
Int. Cl.[4] G01N *23/06, 23/09*
U.S. Cl. 378—51 **16 Claims**



1. A system for measuring the moisture content of a substance comprising:

a fast neutron and gamma-ray source disposed in the vicinity of the substance to irradiate the substance with fast neutrons and gamma-rays, a fast neutron moderator positioned in the path of the fast neutrons and gamma-rays transmitted through the substance,

a unitary Li glass or LiI slow neutron detector having a thickness ranging from 5 mm to 50 mm which can also detect gamma-rays positioned behind or surrounded by the fast neutron moderator to detect slow neutrons, corresponding to or proportional to fast neutrons transmitted through the substance and to detect gamma-rays transmitted through the substance,

counting means operatively associated with the detector for determining the intensities of the detected gamma-rays and the detected slow neutrons, and

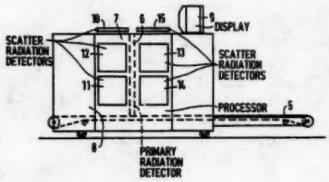
calculating means operatively associated with the counting means for calculating the moisture content of the substance from the intensities.

4,884,289

X-RAY SCANNER FOR DETECTING PLASTIC ARTICLES

Walter Glockmann, Schlangenbad, and Thomas Herwig, Eltville, both of Fed. Rep. of Germany, assignors to Heimann GmbH, Fed. Rep. of Germany

Filed May 22, 1987, Ser. No. 52,981
Claims priority, application Fed. Rep. of Germany, May 28, 1986, 3617893
Int. Cl.[4] G01V *23/04*
U.S. Cl. 378—57 **1 Claim**



1. An x-ray scanner for detecting plastic in articles to be examined comprising:

an x-ray source which emits a fan-shaped x-ray beam in a propagation direction defined by two marginal rays;

means for moving an article to be examined through said x-ray beam;

a primary radiation detector disposed for receiving radiation attenuated by said article, said primary radiation detector being disposed such that said marginal rays are incident at respective extreme edges thereof;

a plurality of scatter radiation detectors disposed spaced from said primary radiation detector behind said article in said propagation direction such that scatter radiation from said article is incident on said scatter radiation detector, said scatter radiation being indicative of plastic in said article; and

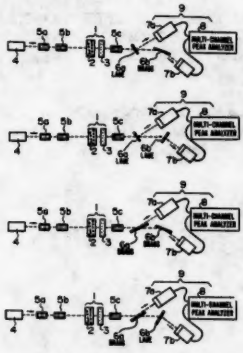
means for separately processing signals from said primary radiation detector and said scatter radiation detectors based on the absorption characteristics of plastic so as to identify the presence of plastic within said article.

4,884,290

METHOD OF ANALYZING COMPOSITION OF OPTICAL FIBER BASE MATERIAL TO BE MEASURED BY RADIOACTIVE RAYS

Junichi Tamura; Ryoichi Hara; Fumihiko Abe, and Hisashi Koaizawa, all of Ichihara, Japan, assignors to The Furukawa Electric Company, Ltd., Tokyo, Japan

Filed Oct. 11, 1985, Ser. No. 786,695
Claims priority, application Japan, Oct. 13, 1984, 59-214580
Int. Cl.[4] G01T 1/36
U.S. Cl. 378—83 12 Claims



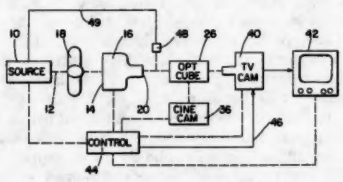
1. A method of analyzing a composition of an optical fiber base material to be measured by x-rays, comprising the steps of:
irradiating x-rays from a radiation generator to the base material contining a plurality of elements
emitting x-rays from the base material along a line of passage,
placing a plurality of single crystals so as to intersect said line of passage, and wherein each of said crystals is independently positioned with respect to each other,
producing from each crystal an X-ray beam of specific energy, and
measuring each X-ray beam of specific energy with a separate radiation detector for each single crystal to analyze the compositions of the plurality of elements in the base material.

4,884,291

X-RAY TELEVISION IMAGING USING DIGITAL CIRCULAR BLANKING

David Nicolay, Fairview Park, Ohio, assignor to Picker International, Inc., Cleveland, Ohio

Filed Jul. 11, 1988, Ser. No. 217,630
Int. Cl.[4] H05G 1/64
U.S. Cl. 378—99 10 Claims



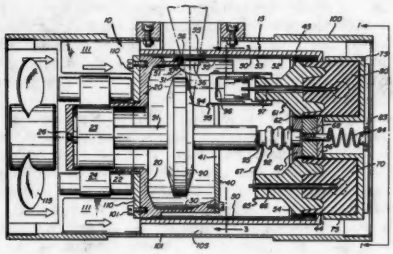
10. An x-ray radiographic imaging system comprising:
(a) a source for directing x-ray energy along a path;
(b) an image intensifier tube aligned in the path for producing at an output face a visual light image corresponding to a pattern of x-rays received incident upon an input face of said image intensifier tube;
(c) a television camera positioned to view said visible light image at said output face of said image intensifier tube, said television camera including a television pick-up tube and circuitry for producing electrical video and horizontal and vertical synchronization signals representing the viewed visible light image as a pattern of raster lines in accordance with a selected one of a plurality of scan formats;
(d) a monitor coupled to receive said video and synchronization signals for producing in response thereto a second visible light image corresponding to said x-ray pattern;
(e) a read only memory containing stored digital information defining for each raster line of said image for a given scan format the approximate blanking and active time required to form a circularly blanked video image;
(f) a line counter synchronized to said vertical synchronization signals from said television camera and responsive to horizontal synchronization signals to increment one count per raster line and additionally having means to reset said counter to zero upon the tracing of the first raster line of the scan, and
(g) at least one additional read only memory containing stored digital information for rendering said read only memory as a look-up table for scaling the size of said active viewing area.

4,884,292

AIR-COOLED X-RAY TUBE

Heinrich F. Klostermann, Menlo Park, Calif., assignor to Medical Electronic Imaging Corporation, Fremont, Calif.

Continuation-in-part of Ser. No. 326,752, Dec. 2, 1981, abandoned, which is a continuation-in-part of Ser. No. 90,501, Nov. 1, 1979, abandoned, which is a continuation-in-part of Ser. No. 71,192, Aug. 30, 1979, abandoned. This application Jun. 27, 1986, Ser. No. 879,598
Int. Cl.[4] H05G 01/02; H01J 35/10
U.S. Cl. 378—127 21 Claims



1. An X-ray tube comprising:
(A) an evacuated tube envelope fabricated primarily of metal, the tube envelope generally comprising a first end wall, a cylindrical side wall and a second end wall;
(B) an anode rotatably mounted in the tube envelope with its target surface facing the second end wall; and drive means for rotating the anode;
(C) a cathode mounted within the tube envelope and positioned to cooperate with the anode to produce a beam of x-rays, and conductor means connected to the anode and cathode for applying electrical potential to produce x-rays;
(D) a heat transfer sleeve within said evacuated tube envelope extending from the first end wall toward the second end wall and beyond the anode and having a free end, the heat transfer sleeve being spaced-apart from the cylindrical side wall of the tube envelope and being disposed

exteriorally of the anode to provide an annular vacuum space, the heat transfer sleeve receiving heat emanating from the anode during operation of the tube to produce X-rays and transferring that heat to the first end wall for dispersal, the heat transfer sleeve and cylindrical side wall of the tube envelope including means permitting the passage therethrough of the desired beam of X-rays from within the tube envelope and exteriorally of the tube envelope; and

(E) air-cooled means for cooling said first end wall.

4,884,293

X-RAY PHOTOGRAPHING APPARATUS

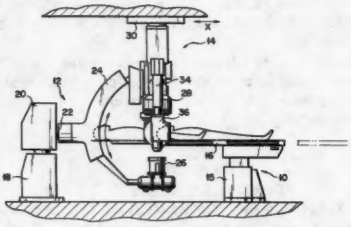
Katsuhiko Koyama, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 18, 1989, Ser. No. 298,137

Claims priority, application Japan, Jan. 19, 1988, 63-7507

Int. Cl.[4] G03B *41/16*

U.S. Cl. 378—197 **8 Claims**



1. An X-ray photographing apparatus comprising:

a first system for photographing an object from a frontal side thereof, said first system including a first arm having a substantially semicircular shape, a first X-ray tube attached to one end of the first arm, a first image intensifier attached to the other end of the first arm and opposed to the first X-ray tube, and first support means for supporting the first arm to be rotatable along its circumference about a rotational center located on an X-ray beam emitted from the first X-ray tube, and to be rotatable about a rotational axis extending in the radial direction of the arm through the rotational center;

a second system for photographing the object from a lateral side thereof, said second system including a second arm having a substantially semicircular shape, a second X-ray tube attached to one end of the second arm, a second image intensifier attached to the other end of the second arm and opposed to the second X-ray tube, and second support means for supporting the second arm to be rotatable along its circumference about a rotational center located on an X-ray beam emitted from the second X-ray tube, and to be rotatable about a rotational axis extending in the radial direction of the second arm through the rotational center;

said first and second arms being supported by the first and second support means to be movable to positions where X-ray beams emitted from the first and second X-ray tubes cross each other and to a reference position where an iso-center defined by said crossing point of the X-ray beams coincides with said rotation centers of the first and second arms;

drive means for rotating and moving the first and second arms; and

means for preventing the first and second arms from interfering with each other when at least one of them is to be rotated, said interfering preventing means including a storing section for storing data relating to relative positions between the first and second arms when at least one of the arms is rotated with the iso-center being held at the reference position, a detecting section for detecting a distance the iso-center shifts from the reference position, an operation section for calculating, on the basis of the data and the detected distance, a position where the first and second arms interfere with each other when at least one of the arms is to be rotated with the iso-center being shifted from the reference position, and driving the drive means in accordance with the calculated interference position, and means for alarming when the first and second arms come near the calculated interference position.

4,884,294

PORTABLE CORDLESS TELEPHONE SET FOR OUTPUTTING VARIOUS DISCRIMINIATION SOUNDS WITH SIMPLE CIRCUIT CONSTRUCTION

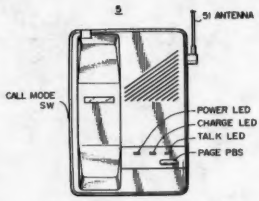
Fujio Inagami, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 26, 1988, Ser. No. 160,765

Claims priority, application Japan, Feb. 27, 1987, 62-043064

Int. Cl.[4] H03B *19/00*

U.S. Cl. 379—61 **10 Claims**



1. A portable cordless telephone set for outputting various types of discrimination sounds in radio communication with a base unit, and having a telephone transmission and reception portion comprising:

a sound generation control circuit operatively connected to said telephone transmission and reception portion to receive a discrimination sound request and having at least one microcomputer;

a clock generation circuit generating an operation clock signal of said sound generation control circuit;

a sound generator generating one of a plurality of discrimination sounds having sound pressures different from one another in response to one of a plurality of resonant frequencies different from one another supplied thereto, one of said resonant frequencies being near a frequency of the operation clock signal of the sound generation control circuit and output from the clock generation circuit, and other resonant frequencies being selected to satisfy the relationship of a ratio of an integer with respect to said one resonant frequency;

a frequency divider circuit operatively connected to the clock generation circuit to receive the clock signal and having at least one frequency divider dividing the clock signal and providing a divider frequency signal;

a switch circuit connected to the clock generation circuit and the frequency divider circuit to selectively output one frequency signal therefrom; and

a timing control circuit operatively connected between the switch circuit and the sound generator, receiving the frequency signal from the switch circuit and outputting an ON/OFF timing signal of the received frequency signal to the sound generator in response to a command from the sound generation control circuit;

the sound generation control circuit energizing the switch circuit and sending the command to the timing control circuit in response to the received discrimination sound request.

DESIGN PATENTS

GRANTED NOV. 28, 1989

ERRATA

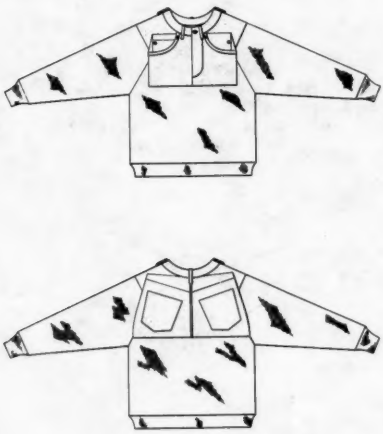
For CLASS	See PATENT NO.
D10-046	304,844
D14-118	4,874

DESIGNS

NOVEMBER 28, 1989

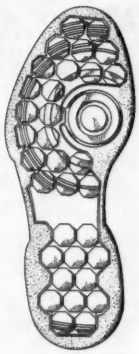
304,775
SCROTAL SUPPORTER
Doris A. Eckenrode, 154 Bertie Ave., Westminster, Md. 21157
Filed Feb. 1, 1988, Ser. No. 150,722
Term of patent 14 years
U.S. Cl. D2—10

304,776
SHIRT OR SIMILAR ARTICLE
Dawn Singer, 19637 W. 12 Mile Rd. #201, Southfield, Mich. 48076
Filed Oct. 6, 1986, Ser. No. 915,578
Term of patent 14 years
U.S. Cl. D2—215

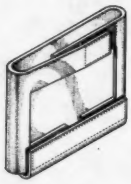


304,777
COMBINED BIB AND CONTAINER POUCH
Joseph G. Glenn, 411 F Odin La., NW., Fort Walton Beach, Fla. 32548
Filed Jul. 16, 1987, Ser. No. 74,461
Term of patent 14 years
U.S. Cl. D2—229

304,778
OUTSOLE FOR A SHOE
Tuan N. Le, Cohassett, and Paul E. Litchfield, Grafton, both of Mass., assignors to Reebok International Ltd., Canton, Mass.
Filed Oct. 2, 1986, Ser. No. 914,762
Term of patent 14 years
U.S. Cl. D2—320

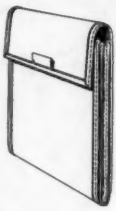


304,779
AUTO SEAT BELT BUCKLE BOOT
Oriel Raphael, and Evelyn G. Raphael, both of 19601 Weeburn La., Tarzana, Calif. 91356
Filed Sep. 26, 1986, Ser. No. 911,822
Term of patent 14 years
U.S. Cl. 2—639



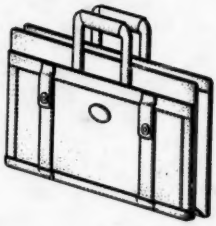
304,780
NOVELTY FAN
George A. Morris, Jr., 720 Fair Oaks Manor, Atlanta, Ga. 30327
Filed Aug. 4, 1986, Ser. No. 892,206
Term of patent 14 years
U.S. Cl. D3—4

304,781
COMPACT DISC HOLDER
Patrick Hanson, 989 Coronado Dr., Glendale, Calif. 91206
Filed Jan. 13, 1986, Ser. No. 817,985
Term of patent 14 years
U.S. Cl. D3—35

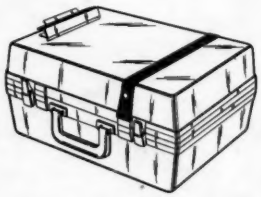


304,782
KEY RING
Henry Sawatsky, and Richard K. Sawatsky, both of Brampton, Canada, assignors to Precisioncraft Limited, Ontario, Canada
Filed Jan. 23, 1986, Ser. No. 824,567
Claims priority, application Canada, Aug. 1, 1985, 01-08-85-2
Term of patent 14 years
U.S. Cl. D3—61

304,783
BRIEF BAG
Robert S. Forman, Chicago, Ill., assignor to Roberts Incentives Corporation, Chicago, Ill.
Filed Jun. 11, 1986, Ser. No. 873,313
Term of patent 14 years
U.S. Cl. D3—71

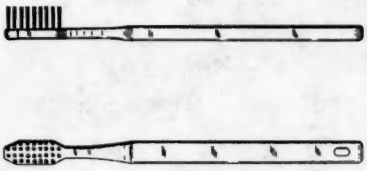


304,784
CARRYING CASE
F. Carlos De Witt, Long Beach, Calif., assignor to Romana Acosta, Los Angeles, Calif.
Filed Mar. 5, 1986, Ser. No. 841,739
Term of patent 14 years
U.S. Cl. D3—76

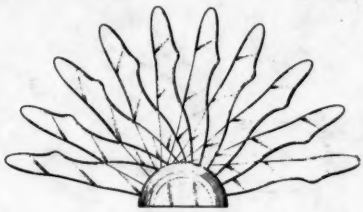


304,785
TOOTHBRUSH
Emanuel B. Tarrson; Dane Maric, both of Chicago, and Thomas P. Kelly, Palatine, all of Ill., assignors to John O. Butler Company, Chicago, Ill.
Filed Mar. 4, 1986, Ser. No. 841,702
The portion of the term of this patent subsequent to Feb. 26, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D4—104

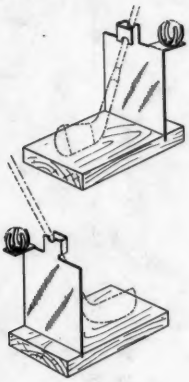
304,786
TOOTH BRUSH
Yoshikazu Kayamura, Osaka, Japan, assignor to Naoji Kayamura, Kyato, Japan
Filed Nov. 13, 1986, Ser. No. 930,431
Claims priority, application Japan, Sep. 19, 1986, 61-037204
Term of patent 14 years
U.S. Cl. D4—104



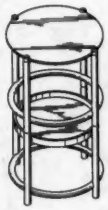
304,787
HOSIERY DISPLAY STAND
John M. Strongosky, McGraw, and David M. Freund, Syracuse, both of N.Y., assignors to RPM Industries, Inc., Auburn, N.Y.
Filed Sep. 12, 1986, Ser. No. 906,784
Term of patent 14 years
U.S. Cl. D6—450



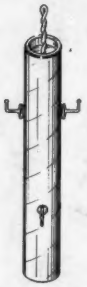
304,788
COMBINED GOLF CLUB AND BALL DISPLAY STAND
Claude L. McJunkin, 12,184 - 111th La., Largo, Fla. 33544
Filed Sep. 15, 1986, Ser. No. 908,084
Term of patent 14 years
U.S. Cl. D6—467



304,789
ACCENT TABLE
Winfried Scholl, Düsseldorf, Fed. Rep. of Germany, assignor to FA. HEWI Heinrich Wilke GmbH, Fed. Rep. of Germany
Division of Ser. No. 771,059, Aug. 30, 1985. This application Jul. 6, 1988, Ser. No. 215,945
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1985, M 246
The portion of the term of this patent subsequent to Jun. 14, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D6—484

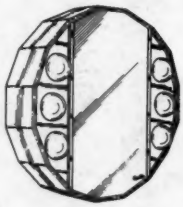


304,790
SUSPENDED CUP HOLDER
Jerry L. Pliett, 1329 Spring Brook Rd., Fort Wayne, Ind. 46825
Filed Mar. 2, 1987, Ser. No. 20,675
Term of patent 14 years
U.S. Cl. D6—514

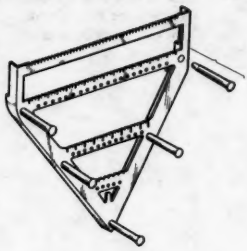


304,791
TOOTHPASTE DISPENSER
James J. DeVigili, Box W411, Old Bridge Rd., Alexandria Bay, N.Y. 13607
Filed Mar. 30, 1987, Ser. No. 32,095
Term of patent 14 years
U.S. Cl. D6—542

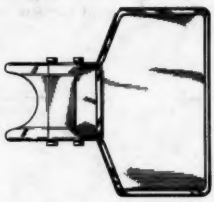
304,792
MIRRORED CABINET
Heinz G. Baus, 35 Wartbodenstrasse, CH-3626 Hünibach-Thun, Switzerland
Filed Aug. 17, 1987, Ser. No. 85,694
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, URA198/87
Term of patent 14 years
U.S. Cl. D6—559



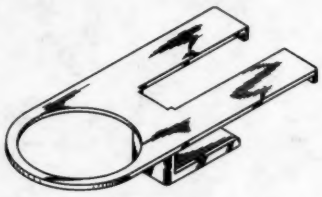
304,793
JEWELRY DISPLAY RACK
Doris Burke, 37620 Lola, Sterling Heights, Mich. 48077
Filed May 18, 1987, Ser. No. 51,027
Term of patent 14 years
U.S. Cl. D6—569



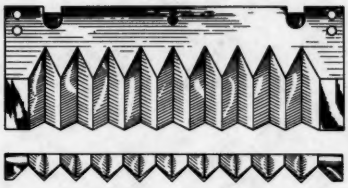
304,794
FOOD-CATCHING TRAY
Timothy Sheard, 243 W. MacDonald Ave., Richmond, Calif. 94801
Filed Feb. 10, 1987, Ser. No. 13,262
Term of patent 14 years
U.S. Cl. D7—37



304,795
BEVERAGE CUP HOLDER
Randall B. Klopp, 9768 E. Fair La., Englewood, Colo. 80111
Filed Dec. 29, 1986, Ser. No. 947,537
Term of patent 14 years
U.S. Cl. D7—70



304,796
ZIG ZAG FRENCH FRY SLAB CUTTER KNIFE
George A. Mendenhall, 4252 S. Eagleson Rd., Boise, Id. 83705
Filed Jun. 10, 1987, Ser. No. 60,378
Term of patent 14 years
U.S. Cl. D7—106

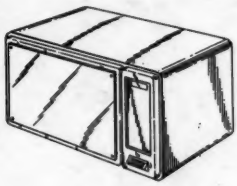


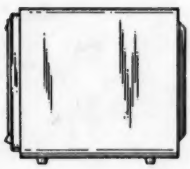
304,797
UTENSIL FOR OPENING HARD-SHELLED SEAFOOD
Dallas Perkins, 4711 N. 48th Dr., Phoenix, Ariz. 85031
Filed Oct. 31, 1986, Ser. No. 925,670
Term of patent 14 years
U.S. Cl. D7—106

304,798
KNIFE
Lynn C. Thompson, Ventura, Calif., assignor to Cold Steel, Inc., Ventura, Calif.
Filed May 28, 1986, Ser. No. 868,420
Term of patent 14 years
U.S. Cl. D7—151

304,799
PITCHER
T. Brent Freese, Winchester, Va., assignor to Rubbermaid Commercial Products Inc., Winchester, Va.
Filed Jan. 8, 1987, Ser. No. 1,671
Term of patent 14 years
U.S. Cl. D7—319

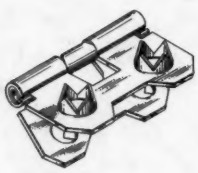
304,800
MICROWAVE OVEN
Seung H. Yoo, Buchon, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Feb. 18, 1987, Ser. No. 16,179
Claims priority, application Rep. of Korea, Aug. 27, 1986, 86-12210
The portion of the term of this patent subsequent to Nov. 7, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—351



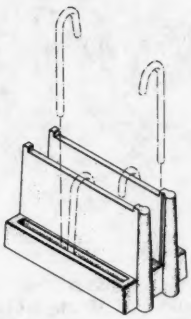


304,801
HANDLE UNIT FOR SHEARS
Robert S. Gingher, Greensboro, N.C., assignor to Scissaires, Inc., Greensboro, N.C.
Filed Apr. 25, 1986, Ser. No. 857,585
Term of patent 14 years
U.S. Cl. D8—57

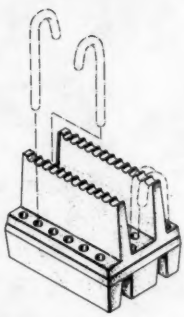
304,802
EASEL HINGE
Han Ung Yi, Seoul, Rep. of Korea, assignor to Starlight Industries, Inc., Brooklyn, N.Y.
Filed Nov. 15, 1988, Ser. No. 271,776
Term of patent 14 years
U.S. Cl. D8—328



304,803
PACKAGE FOR CANDY CANES
Donald H. Young, Decatur, Ala., assignor to Bob's Candies, Inc., Albany, Ga.
Filed Sep. 23, 1986, Ser. No. 911,083
Term of patent 14 years
U.S. Cl. D9—341

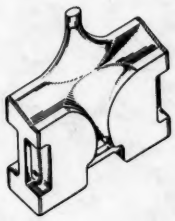


304,804
PACKAGE FOR CANDY CANES
Donald H. Young, Decatur, Ala., assignor to Bob's Candies, Inc., Albany, Ga.
Filed Oct. 6, 1986, Ser. No. 915,922
Term of patent 14 years
U.S. Cl. D9—341



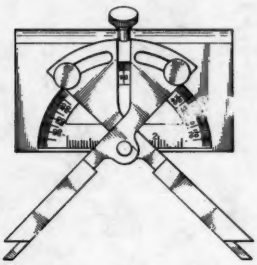
304,805
BOTTLE
Juris M. Mednis, Howell, N.J., assignor to Universal Symetrics Corporation, Howell, N.J.
Filed Apr. 15, 1987, Ser. No. 38,588
Term of patent 14 years
U.S. Cl. D9—376

304,806
BOTTLE
Juris M. Mednis, Howell, N.J., assignor to Universal Symetrics Corporation, Howell, N.J.
Filed Apr. 15, 1987, Ser. No. 38,596
Term of patent 14 years
U.S. Cl. D9—376



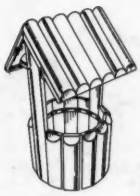
304,807
QUARTZ DIGITAL CLOCK WITH PULL OUT BRACKET AND UNIVERSAL MOUNT
Marc R. Iacovelli, Miami, Fla., assignor to Rally Manufacturing, Inc., Miami, Fla.
Filed Dec. 5, 1986, Ser. No. 938,753
Term of patent 14 years
U.S. Cl. D10—15

304,808
MAT MARKING AND GUIDE DEVICE
Charles H. Carithers, Jr., 5752A Gallant Dr., Jackson, Miss. 39236
Filed Dec. 1, 1986, Ser. No. 936,258
Term of patent 14 years
U.S. Cl. D10—65

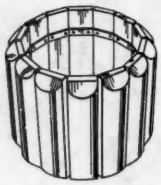


304,809
LINK ELEMENT
Paolo Bulgari, Rome, Italy, assignor to Partecipazioni Bulgari S.p.A., Rome, Italy
Filed Dec. 14, 1987, Ser. No. 132,133
Claims priority, application Italy, Jun. 22, 1987, 35872-87[U]
Term of patent 14 years
U.S. Cl. D11—93

304,810
COMBINED PLANTER AND COVER
Rick K. Thurman, 2623 Crawford, Parsons, Kans. 67357
Filed Apr. 1, 1987, Ser. No. 33,483
Term of patent 14 years
U.S. Cl. D11—149

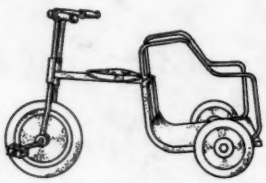


304,811
PLANTER
Rick K. Thurman, 2623 Crawford, Parsons, Kans. 67357
Filed Apr. 1, 1987, Ser. No. 33,490
Term of patent 14 years
U.S. Cl. D11—152

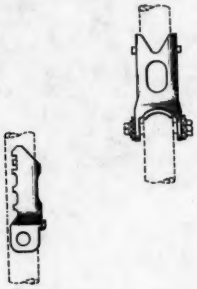


304,812
DISPLAY BUTTON
Robert J. De brey, 4502 Browndale Ave., Edina, Minn. 55424
Filed Dec. 3, 1986, Ser. No. 937,669
Term of patent 14 years
U.S. Cl. D11—227

304,813
TRICYCLE
Ray G. Kelly, St. Louis, Mo., assignor to Angeles Nursery Toys, Inc., Pacific, Mo.
Filed Dec. 11, 1987, Ser. No. 131,522
Term of patent 14 years
U.S. Cl. D12—113



304,814
FOLDABLE FOOTPEG FOR BICYCLES
Robert B. Haro, Encinitas, Calif., assignor to The Derby Cycle Corporation, Carson, Calif.
Filed May 20, 1987, Ser. No. 51,608
Term of patent 14 years
U.S. Cl. D12—114

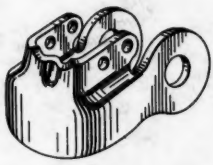


304,815
WHEELCHAIR WHEEL
Ralph P. Jones, Camarillo, Calif., assignor to Everest & Jennings, Inc., Camarillo, Calif.
Continuation-in-part of Ser. No. 789,459, Oct. 21, 1985, abandoned. This application Sep. 8, 1986, Ser. No. 904,250
Term of patent 14 years
U.S. Cl. D12—133

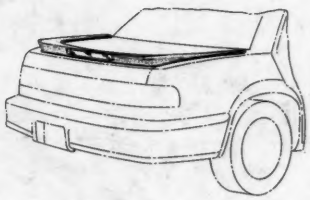
304,816
AUTOMOBILE TIRE
Kouichi Tatsumi, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Mar. 17, 1987, Ser. No. 26,653
Claims priority, application Japan, Dec. 9, 1986, 61-48713
Term of patent 14 years
U.S. Cl. D12—151

304,817
TIRE VALVE
John R. Earley, Lynchburg, and Paul Stewart, Hurt, both of Va., assignors to Bridge Products, Inc., Northbrook, Ill.
Filed Dec. 19, 1985, Ser. No. 811,009
Term of patent 14 years
U.S. Cl. D12—153

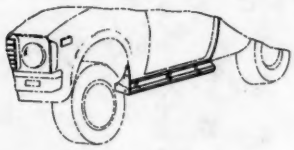
304,818
TRAILER COUPLER YOKE
James W. Chambers, Rockford, Ill., assignor to Atwood Industries, Inc., Rockford, Ill.
Filed Jun. 4, 1987, Ser. No. 57,852
Term of patent 14 years
U.S. Cl. D12—162



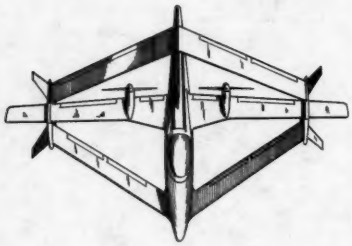
304,819
COMBINED REAR SPOILER AND LIGHT
Leif H. Chapman, Sylvan Lake, and Richard F. Ruzzin, Grosse Pointe, both of Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Sep. 14, 1987, Ser. No. 95,935
Term of patent 14 years
U.S. Cl. D12—181

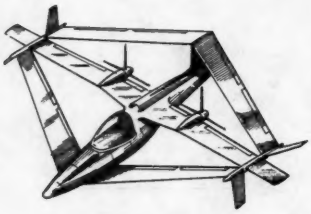


304,820
LOWER SIDE PROTECTOR FOR VEHICLES
Craig Rasmussen, 578 Bringhurse Dr., Providence, Utah 84332
Filed Feb. 2, 1987, Ser. No. 10,175
Term of patent 14 years
U.S. Cl. D12—190

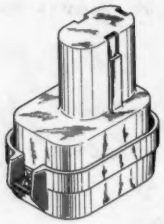


304,821
TRI-CHANNEL WING AIRCRAFT
Alexander Ratony, 2076 Shadybrook, Thouand Oaks, Calif. 91362
Filed Jul. 14, 1986, Ser. No. 885,187
Term of patent 14 years
U.S. Cl. D12—331

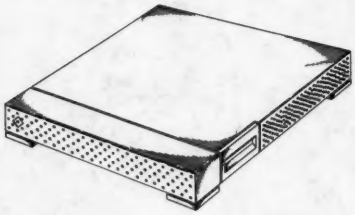




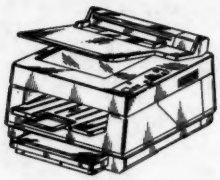
304,822
BATTERY PACK
Fusao Fushiya; Michio Okumura, and Yoshiyuki Kubota, all of Anjo, Japan, assignors to Makita Electric Works, Ltd., Anjo, Japan
Filed Dec. 16, 1988, Ser. No. 285,229
Claims priority, application Japan, Jul. 9, 1988, 63-27440
Term of patent 14 years
U.S. Cl. D13—8



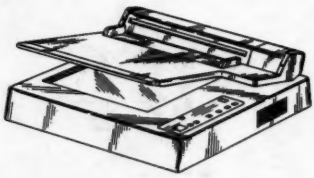
304,823
COMPUTER HOUSING
Herbert Pfeifer, San Jose, and Howell Hsiao, Mountain View, both of Calif., assignors to Sun Microsystems, Inc., Mountain View, Calif.
Filed Feb. 9, 1988, Ser. No. 154,128
Term of patent 14 years
U.S. Cl. D14—100



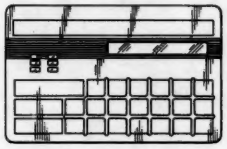
304,824
COMBINATION PRINTER AND IMAGE SCANNER
Kunio Hara, Chiba, and Shin-ichi Hiroki, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Jan. 28, 1988, Ser. No. 150,316
Claims priority, application Japan, Aug. 3, 1987, 62-31264
Term of patent 14 years
U.S. Cl. D14—107



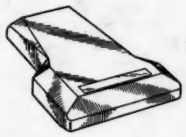
304,825
IMAGE SCANNER
Kunio Hara, Chiba, and Shin-ichi Hiroki, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Tokyo, Japan
Filed Feb. 2, 1988, Ser. No. 151,077
Claims priority, application Japan, Aug. 3, 1987, 62-31263
Term of patent 14 years
U.S. Cl. D14—107



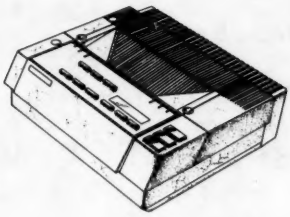
304,826
INTEGRATED CIRCUIT CARD WITH MAGNETIC READER STRIP AND KEYBOARD AND DISPLAY
Shigeru Sutoh, Urawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Oct. 31, 1988, Ser. No. 264,520
Claims priority, application Japan, May 18, 1988, 63-19213
Term of patent 14 years
U.S. Cl. D14—117



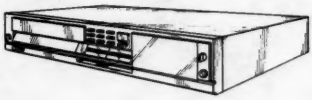
304,827
IMAGE SCANNER
Mineo Kubota, Kofu, Japan, assignor to Nippon Seimitsu Kogyo Kabushiki Kaisha, Kofu, Japan
Filed Oct. 5, 1987, Ser. No. 104,495
Claims priority, application Japan, Apr. 4, 1987, 62-13206
Term of patent 14 years
U.S. Cl. D14—116



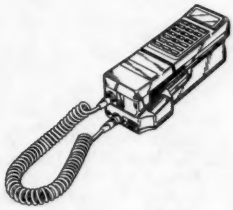
304,828
FACSIMILE TRANSCEIVER/RECEIVER
Hiroaki Watanabe, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Apr. 7, 1987, Ser. No. 35,291
Claims priority, application Japan, Oct. 7, 1986, 61-39692
Term of patent 14 years
U.S. Cl. D14—118

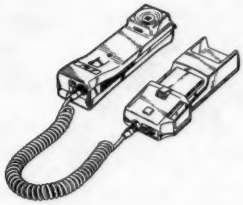


304,829
COMBINED COMPACT DISC PLAYER AND TAPE RECORDER
Masafumi Ito; Sigeru Hasegawa; Haruki Takita, and Minoru Sube, all of Tokyo, Japan, assignors to Teac Corporation, Tokyo, Japan
Filed Jun. 18, 1986, Ser. No. 875,790
Claims priority, application Japan, Dec. 19, 1985, 60-52869
Term of patent 14 years
U.S. Cl. D14—135

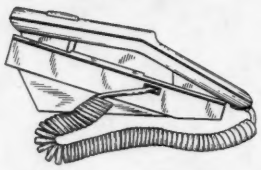


304,830
MOBILE TELEPHONE SET
Shigeru Sutoh, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Sep. 21, 1988, Ser. No. 247,323
Claims priority, application Japan, May 9, 1988, 63-17910
Term of patent 14 years
U.S. Cl. D14—138

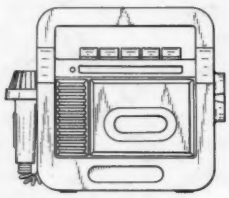




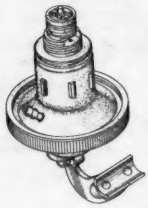
304,831
TELEPHONE SET
Ping Kwan Ng, Flat 1506, 15th Floor, Block N, Kornhill, No. 14, Hong On Street, Quarry Bay, Hong Kong
Filed Jan. 19, 1988, Ser. No. 145,778
Claims priority, application United Kingdom, Oct. 14, 1987, 1045613
Term of patent 14 years
U.S. Cl. D14—140



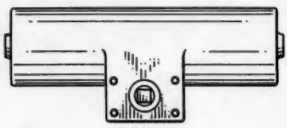
304,832
TAPE RECORDER
Patrick J. Murphy, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Sep. 29, 1987, Ser. No. 102,086
Term of patent 14 years
U.S. Cl. D14—165



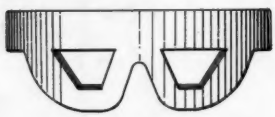
304,833
PISTON DIAPHRAGM PUMP FOR ATTACHMENT TO PRESSURIZED SPRAYER CONTAINERS
Pedro W. Luchsinger, Panamericana 445 Lagos de Moreno, C.P. 47400, Jalisco, Mexico
Filed Jun. 1, 1987, Ser. No. 56,529
Term of patent 14 years
U.S. Cl. D15—7



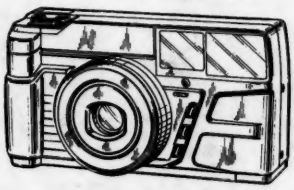
304,834
ROTARY ACTUATOR
Helmut Habicht, 15 Royal Park Ter., Hillsdale, N.J. 07642
Filed Jun. 16, 1986, Ser. No. 875,368
Term of patent 14 years
U.S. Cl. D15—148



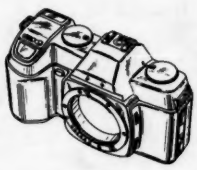
304,835
EYEGLASS FRAME
Robert A. Hodges, 320-178 Swanson, Saginaw, Mich. 48603
Filed Apr. 20, 1987, Ser. No. 40,863
Term of patent 14 years
U.S. Cl. D16—107



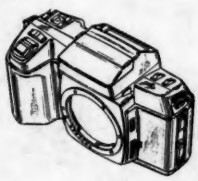
304,836
35 MM CAMERA
Susumu Koshino, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 8, 1987, Ser. No. 1,492
Claims priority, application Japan, Sep. 1, 1986, 61-34504
Term of patent 14 years
U.S. Cl. D16—209



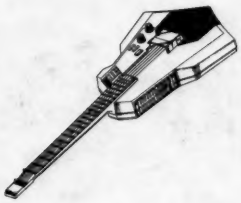
304,837
SINGLE-LENS REFLEX CAMERA BODY
Koki Onuma, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 8, 1987, Ser. No. 1,489
Claims priority, application Japan, Aug. 20, 1986, 61-32590
Term of patent 14 years
U.S. Cl. D16—217



304,838
SINGLE-LENS REFLEX CAMERA BODY
Masato Yamamoto, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 8, 1987, Ser. No. 1,491
Claims priority, application Japan, Aug. 20, 1986, 61-32591
Term of patent 14 years
U.S. Cl. D16—217

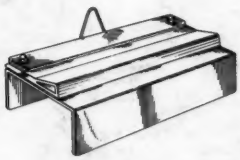


304,839
ELECTRONIC GUITAR
Yoshitaka Naito, Tachikawa, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan
Filed Jun. 4, 1987, Ser. No. 58,022
Term of patent 14 years
U.S. Cl. D17—14

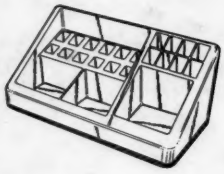


304,840
MARKING PEN
Keiichi Mizutani, and Akira Ohashi, both of Nagoya, Japan, assignors to Shachihata Industrial Co., Ltd., Nagoya, Japan
Filed Jun. 24, 1986, Ser. No. 877,994
Claims priority, application Japan, Dec. 26, 1985, 60-54603
The portion of the term of this patent subsequent to May 23, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D19—43

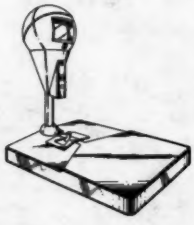
304,841
LABEL PEELER
John S. Horger, 26285 Augusta Dr., Lake Arrowhead, Calif. 92352
Filed May 19, 1986, Ser. No. 864,945
Term of patent 14 years
U.S. Cl. D19—69



304,842
ORGANIZER TRAY
Reina A. Barone, Mill Valley, and Bruce W. Burtch, Sausalito, both of Calif., assignors to Burtch Barone, Inc., Sausalito, Calif.
Filed Nov. 20, 1986, Ser. No. 933,582
Term of patent 14 years
U.S. Cl. D19—75

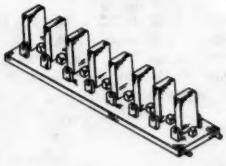


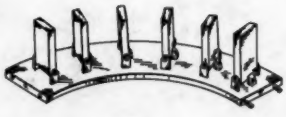
304,843
SIMULATED GOLF GAME APPARATUS
Peter S. Tonner, Saskatoon, Canada, assignor to Joytec Ltd., Burnaby, Canada
Filed May 13, 1986, Ser. No. 862,890
Claims priority, application Canada, Jan. 31, 1986, 31-01-86-1
Term of patent 14 years
U.S. Cl. D21—11



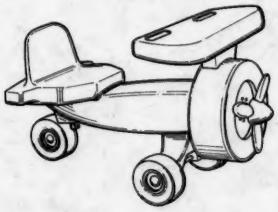
304,844
FOOTBALL DIGITAL DISPLAY MARKER OR SIMILAR ARTICLE
Robert L. Smith, 8409 Flora, Kansas City, Mo. 64131
Filed Nov. 20, 1986, Ser. No. 933,067
Term of patent 14 years
U.S. Cl. D10—46.1

304,845
CONNECTABLE TOPPLING TOY
Philip R. Inglee, 13375 Braun Rd., Golden, Colo. 80401
Filed Jul. 7, 1986, Ser. No. 882,835
Term of patent 14 years
U.S. Cl. D21—59

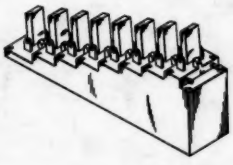




304,846
TOY RIDING AIRPLANE
Daniel G. Hahn, 1040 E. North Ave., Olney, Ill. 62450
Filed Dec. 15, 1986, Ser. No. 941,935
Term of patent 14 years
U.S. Cl. D21—77

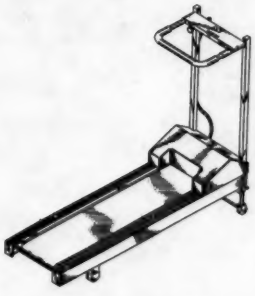


304,847
CONNECTABLE TOPPLING TOY
Philip R. Inglee, 13375 Braun Rd., Golden, Colo. 80401
Division of Ser. No. 882,835, Jul. 7, 1986. This application Apr. 17, 1989, Ser. No. 338,767
Term of patent 14 years
U.S. Cl. D21—59



304,848
DOLL
Scott M. Dreicer, 8201 Shady Grove Rd., Jacksonville, Fla. 32216, and Morris Shriftman, 33 S. Hogan, Jacksonville, Fla. 32202
Filed Jul. 8, 1986, Ser. No. 883,269
Term of patent 14 years
U.S. Cl. D21—155

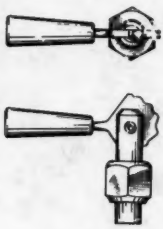
304,849
TREADMILL EXERCISER
Scott R. Watterson, River Heights, Utah, assignor to Weslo, Inc., Logan, Utah
Filed Dec. 29, 1986, Ser. No. 947,494
Term of patent 14 years
U.S. Cl. D21—192



304,850
TRAMPOLINE EXERCISER
Arthur E. Chambers, 21421 North Seventh Ave., Phoenix, Ariz. 85027-2998
Filed Oct. 26, 1987, Ser. No. 112,435
Term of patent 14 years
U.S. Cl. D21—235

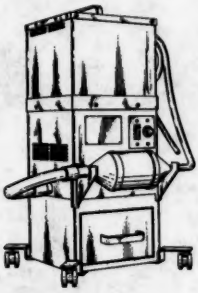
304,851
BALL RETRIEVER HEAD ASSEMBLY
Donald J. Allison, Manchester, and Rodney J. Spielman, Vernon, both of Conn., assignors to Golftech Inc., Ellington, Conn.
Filed Aug. 15, 1986, Ser. No. 896,876
Term of patent 14 years
U.S. Cl. D21—234

304,852
ACTUATOR HANDLE FOR PRESSURE SELECTING VALVE
McLane Tilton, Buellton, Calif., assignor to Tilton Engineering, Inc., Buellton, Calif.
Filed Jan. 31, 1986, Ser. No. 824,617
Term of patent 14 years
U.S. Cl. D23—252

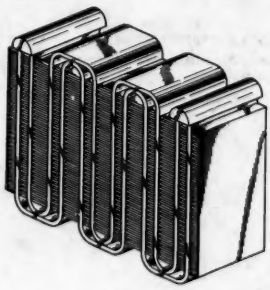


304,853
FAUCET SPOUT
Edmond Pery, Blégny, Belgium, and Edmond Pery, Blégny, Belgium, assignors to Sunset Collection S.P.R.L., Blégny, Belgium
Filed Aug. 26, 1985, Ser. No. 769,096
Claims priority, application World Int. Prop. O., May 22, 1985, DM/005285
Term of patent 14 years
U.S. Cl. D23—257

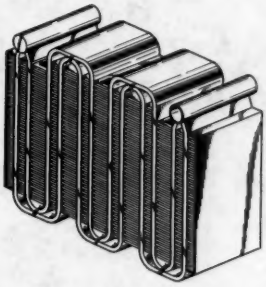
304,854
PORTABLE AIR FILTER
Wyman H. Stackhouse, Manhattan Beach, and Ian M. Williamson, Redondo Beach, both of Calif., assignors to Stackhouse Associates, El Segundo, Calif.
Filed Apr. 27, 1988, Ser. No. 187,075
Term of patent 14 years
U.S. Cl. D23—365



304,855
HEAT EXCHANGER
Hisao Aoki, Tamamura, Japan, assignor to Sanden Corporation, Gunma, Japan
Filed Aug. 19, 1985, Ser. No. 767,049
The portion of the term of this patent subsequent to Nov. 28, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—386



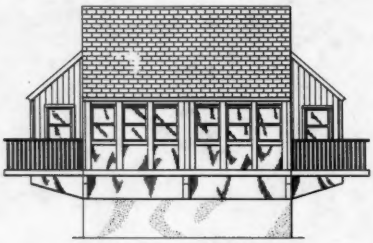
304,856
HEAT EXCHANGER
Hisao Aoki, Tamamura, Japan, assignor to Sanden Corporation, Gunma, Japan
Filed Aug. 19, 1985, Ser. No. 767,022
The portion of the term of this patent subsequent to Nov. 28, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—386



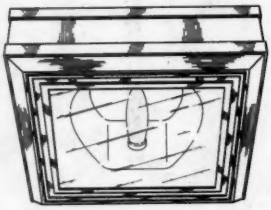
304,857
DISPENSING TOOL FOR DENTAL RETENTION PINS
Harald E. Nordin, Villa Amphion, 1822 Chernex, Switzerland
Filed Nov. 9, 1987, Ser. No. 118,353
Claims priority, application Hague, May 15, 1987, DMA/000 626
Term of patent 14 years
U.S. Cl. D24—10

304,858
COMBINED ROOT CANAL FILE AND GRIP HANDLE
Klas Tofft, Lidingo, Sweden, assignor to AB John Sjoding, Sweden
Filed May 8, 1987, Ser. No. 47,067
Claims priority, application Sweden, Nov. 10, 1986, 86-2588
Term of patent 14 years
U.S. Cl. D24—10

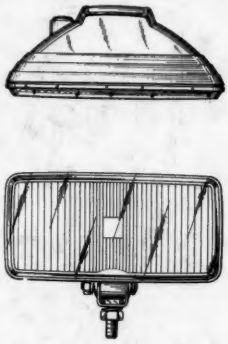
304,859
ONE STORY PEDESTAL DUPLEX
Bertram Zusman, 4112 Monticello Blvd., Youngstown, Ohio 44505
Filed Jul. 1, 1987, Ser. No. 68,402
Term of patent 14 years
U.S. Cl. D25—17



304,860
STREET-LAMP
Nicolas O'Dohanue, Montreal, and Francois Lecuyer, Laval, both of Canada, assignors to Lumec, Inc., Boisbriand, Canada
Filed Jan. 8, 1987, Ser. No. 1,560
Claims priority, application Canada, Aug. 19, 1986, 19-08-86-13
Term of patent 14 years
U.S. Cl. D26—67

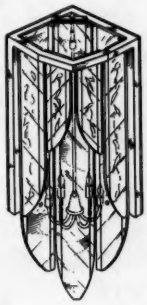


304,861
AUXILIARY HEADLAMP FOR MOTOR VEHICLES
Gerd Schmid, Velbert, Fed. Rep. of Germany, assignor to Hella KG Hueck & Co., Lippstadt, Fed. Rep. of Germany
Filed Jan. 28, 1988, Ser. No. 149,195
Claims priority, application Fed. Rep. of Germany, Aug. 21, 1987, MR 586
Term of patent 14 years
U.S. Cl. D26—29



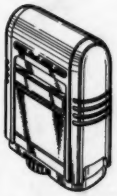
304,862
CORNICE LIGHTING REFLECTOR OR THE LIKE
Vince DiCola, Louisville, Ky., assignor to Thomas Industries Inc., Louisville, Ky.
Filed Jul. 6, 1987, Ser. No. 69,949
Term of patent 14 years
U.S. Cl. D26—76

304,863
CORNER LIGHTING FIXTURE
Reynolds K. Ohai, 8135 Pinositas Rd., Whittier, Calif. 90605
Filed Apr. 6, 1987, Ser. No. 35,148
Term of patent 14 years
U.S. Cl. D26—85

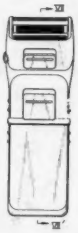


304,864
EYELASH CURLER
Robert F. Stein, 2476 Glencoe Ave., Venice, Calif. 90291
Filed Dec. 9, 1987, Ser. No. 132,052
Term of patent 14 years
U.S. Cl. D28—36

304,865
COMBINED ELECTRIC SHAVER AND BLADE COVER THEREFOR
Shinji Yamamoto, and Masashi Nomura, both of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan
Filed Dec. 31, 1987, Ser. No. 140,316
Claims priority, application Japan, Jul. 15, 1987, 62-28782
Term of patent 14 years
U.S. Cl. D28—49



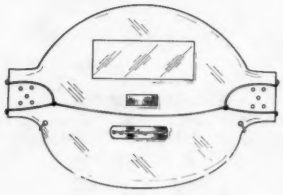
304,866
ELECTRIC SHAVER
Kazuyoshi Yonezawa, Kadoma, Japan, and Florian Seiffert, Wiesbaden, Fed. Rep. of Germany, assignors to Matsushita Electric Works, Ltd., Osaka, Japan
Filed Aug. 4, 1987, Ser. No. 81,172
Claims priority, application Japan, Feb. 16, 1987, 5694/1987
Term of patent 14 years
U.S. Cl. D28—49



304,867
HAIR CLIPPER
Kiyoshi Okamoto, 2415 Van Ness Ave., #605, San Francisco, Calif. 94109
Filed Jun. 19, 1987, Ser. No. 63,858
Term of patent 14 years
U.S. Cl. D28—53

304,868
SAFETY RAZOR AND STAND
Paul Spencer, P.O. Box 2378, Gardena, Calif. 90247
Filed Sep. 23, 1985, Ser. No. 778,856
Term of patent 14 years
U.S. Cl. D28—73

304,869
PROTECTIVE FACIAL MASK
Connie Mattox, Rte. 3, Box 270, Buffalo, Mo. 65622
Filed Dec. 1, 1987, Ser. No. 129,071
Term of patent 14 years
U.S. Cl. D29—8



304,870

TRAY FOR HOLDING AQUATIC ORGANISMS OR THE LIKE

Edgar G. Mason, Crapaud, Canada, assignor to Marine Lobster Farms Ltd., Canada

Filed Jun. 25, 1986, Ser. No. 878,494

Claims priority, application Canada, Jan. 9, 1986, 09-01-86-8

Term of patent 14 years

U.S. Cl. D30—115

304,871

COMBINED RECHARGEABLE VACUUM CLEANER AND CHARGER

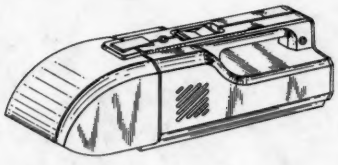
John S. Yuen, Kowloon, Hong Kong, assignor to John Manufacturing Limited, Kowloon, Hong Kong

Filed Oct. 31, 1986, Ser. No. 925,661

Claims priority, application United Kingdom, May 2, 1986, 1033849

Term of patent 14 years

U.S. Cl. D32—18



304,872

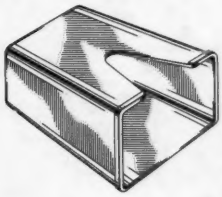
TRASH FUNNEL

Richard P. Jebb, P.O. Box 518, Hawthorne, Fla. 32640

Filed Sep. 8, 1987, Ser. No. 94,103

Term of patent 14 years

U.S. Cl. D34—1



304,873

RECYCLING CONTAINER

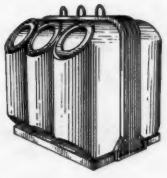
Lothar Ruehland, Grasgarten 34, 3304 Wendeburg/Bortfeld, Fed. Rep. of Germany

Filed Nov. 18, 1987, Ser. No. 122,883

Claims priority, application Fed. Rep. of Germany, May 18, 1987, 36 MR 1394; Oct. 6, 1987, 36 MR 1412; Oct. 6, 1987, 36 MR 1411

Term of patent 14 years

U.S. Cl. D34—5



304,874

FACSIMILE TRANSCEIVER

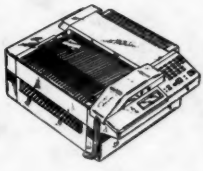
Masahito Saegusa, Mitaka; Kazunori Hashimoto, Tachikawa; Yoshihiro Kawakatsu, Sayama; Katsubumi Ohuchi, Chigasaki; Hiroshi Endo, and Masaki Sato, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 23, 1987, Ser. No. 6,598

Claims priority, application Japan, Jul. 25, 1986, 61-28944

Term of patent 14 years

U.S. Cl. D14—118



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF NOVEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A-Dec, Inc.: *See*—
Austin, George K., Jr.; and Parlier, Mathew H., 4,883,316, Cl. 297-191.000.

A&M Cousin: *See*—
Pipon, Yves; and Chales, Bernard, 4,882,943, Cl. 74-409.000.

Abatement Technologies, Inc.: *See*—
Flannery, Gene; Crouse, T. Blair; and Patterson, Wesley L., 4,883,329, Cl. 312-1.000.

ABB Cerama AB: *See*—
Adlerborn, Jan; Larker, Hans; and Nilsson, Jan, 4,883,639, Cl. 419-49.000.

Abbing, Andreas; Bertling, Hannes; Kehl, George; Mergenthaler, Robert; Rischen, Dietmar; Schafer, Ernst-Dieter; Schmitt, Edgar; and Siegel, Heinz, to Robert Bosch GmbH. Brake booster. 4,882,976, Cl. 91-376.00R.

Abbott Laboratories: *See*—
Holen, James T.; and Kazlauskas, Vidas P., 4,883,763, Cl. 436-45.000.

Abboud, George E.; Such, Christopher H.; Horley, Susan M.; and Waters, Julian A., to Imperial Chemical Industries PLC. Methacryloxy-containing compounds. 4,883,873, Cl. 544-316.000.

Abe, Fumihiko: *See*—
Tamura, Junichi; Hara, Ryoichi; Abe, Fumihiko; and Koaizawa, Hisashi, 4,884,290, Cl. 378-83.000.

Abe, Masahiko: *See*—
Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 4,883,596, Cl. 210-638.000.

Abe, Masayuki: *See*—
Ueda, Masanori; Abe, Masayuki; Shitani, Kensai; Yoshimoto, Tetsuo; Yamamoto, Hiroki; and Kurosawa, Fumio, 4,883,544, Cl. 148-2.000.

Abe, Norimoto: *See*—
Abe, Tomiya; Shimazaki, Yukio; Ishibashi, Takanobu; Abe, Norimoto; Asai, Takayasu; and Taketani, Noriaki, 4,883,338, Cl. 350-96.340.

Abe, Shinya: *See*—
Nakamoto, Kouji; Suzuki, Takeshi; Abe, Shinya; Hayashi, Kenji; Kajiwara, Akiharu; Yamatsu, Isao; Otsuka, Issei; and Shiojiri, Hiroyuki, 4,883,916, Cl. 564-186.000.

Abe, Tomiya; Shimazaki, Yukio; Ishibashi, Takanobu; Abe, Norimoto; Asai, Takayasu; and Taketani, Noriaki, to Hitachi Cable, Ltd. & Hitachi, Ltd. Synthetic resin optical fiber. 4,883,338, Cl. 350-96.340.

Abe, Yoshihito; Yaginuma, Katsuhiro; Nagasawa, Takeshi; and Kuroiwa, Katsumasa, to Nitto Boseki Co., Ltd. Tripeptide derivatives and antiplasmin agents containing the same. 4,883,863, Cl. 530-331.000.

Abele, Berthold W., to KSA Dichtsysteme GmbH & Co. KG. Apparatus for sealing conjoined conductors of cables. 4,883,919, Cl. 174-93.000.

Abou-Gharbia, Magid A., to American Home Products Corporation. Antipsychotic imides. 4,883,875, Cl. 546-16.000.

Acquaro, William D. Cargo trailer safety lock. 4,883,393, Cl. 410-52.000.

Acumeter Laboratories, Inc.: *See*—
McIntyre, Frederic S., 4,883,691, Cl. 427-434.200.

Adachi, Mitsuhiro, to Tachikawa Spring Co., Ltd. Vehicle seat. 4,883,318, Cl. 297-234.000.

Adamson, Arthur P.; and Gliebe, Philip R., to General Electric Company. Aircraft propeller noise reduction. 4,883,240, Cl. 244-69.000.

Adi Diagnostics Inc.: *See*—
Heelies, Donald R., 4,883,760, Cl. 435-296.000.

Adlerborn, Jan; Larker, Hans; and Nilsson, Jan, to ABB Cerama AB. Method of manufacturing an object of a powdered material by isostatic pressing. 4,883,639, Cl. 419-49.000.

Admiralty Group Ltd.: *See*—
Harp, James J.; and Molten, Robert, 4,883,140, Cl. 180-116.000.

Advanced Extraction Technologies, Inc.: *See*—
Mehra, Yuv R., 4,883,514, Cl. 62-17.000.
Mehra, Yuv R.; and Coffey, Freylon B., 4,883,515, Cl. 62-17.000.

Advanced Medical Technologies Inc.: *See*—
Lindmayer, Istvan, 4,883,483, Cl. 604-411.000.

Advanced Micro Devices, Inc.: *See*—
Dixit, Pankaj; Sliwa, Jack; Klein, Richard K.; Sander, Craig S.; and Farnaam, Mohammad, 4,884,123, Cl. 357-71.000.
Kong, Samuel K.; Jiang, William Y.; and Chan, Wallace C. W., 4,884,165, Cl. 361-98.000.

Advanced Technology Laboratories, Inc.: *See*—
Stedman, David; and Harui, Norio, 4,883,059, Cl. 128-660.010.

Aerojet-General Corporation: *See*—
Schoenman, Leonard, 4,882,904, Cl. 60-258.000.

Aerotech, Inc.: *See*—
Aiello, Michael E., 4,884,016, Cl. 318-685.000.

AFA Products, Inc.: *See*—
Maas, Joseph W. J., 4,883,227, Cl. 239-120.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Pertzsch, Albert; Brunner, Hubert; and Zeroni, Ludwig, 4,884,158, Cl. 360-132.000.
Thiele, Hartmut; and Mauser, Heinz, 4,883,175, Cl. 206-387.000.

AGFA-Gevaert Aktiengesellschaft: *See*—
Kampfer, Helmut; and Himmelmann, Wolfgang, 4,883,880, Cl. 546-347.000.
Thiele, Hartmut; and Toral, Jose , 4,883,178, Cl. 206-391.000.

Agnew, Palmer W.; Clayton, Neil H.; Judkovics, Monroe; Rivero, Jose L.; and Sun, Kuo-chang, to International Business Machines Corporation. Knowledge system with improved request processing. 4,884,218, Cl. 364-513.000.

Agrawa, Rakesh; Auvil, Steven R.; and Wilson, Keith B., to Air Products and Chemicals, Inc. Process for the production of high pressure nitrogen with split reboil-condensing duty. 4,883,519, Cl. 62-39.000.

Agrawal, Anant: *See*—
Garner, Robert B.; and Agrawal, Anant, 4,884,198, Cl. 364-200.000.

Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, to Tokyo Organic Chemical Industries, Ltd. Carbonaceous adsorbent for removal of pyrogen and method of producing pure water using same. 4,883,596, Cl. 210-638.000.

Ahn, Hee K., to Samsung Electronics Co., Ltd. Single driving system for tape loading and reel mode conversion of VCR. 4,884,153, Cl. 360-85.000.

Ahne, Hellmut; and Plundrich, Winfried, to Siemens Aktiengesellschaft. Method for manufacturing heat-stable structured layers based on expoxy resin. 4,883,730, Cl. 430-18.000.

Ahrin BV: *See*—
Breeuwer, Rene , 4,882,931, Cl. 73-189.000.

Aiba, Masaaki: *See*—
Makishima, Tatsuo; Hirai, Tadaaki; Tsuji, Kazutaka; Ishioka, Sachio; Yamashita, Takashi; Shidara, Keiichi; Yamazaki, Junichi; and Aiba, Masaaki, 4,884,011, Cl. 315-368.000.

Aiello, Michael E., to Aerotech, Inc. Closed loop torque angle control of synchronous motor. 4,884,016, Cl. 318-685.000.

Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, to Hoffmann-La Roche Inc. Phenyl substituted-2,4,6,8-nonatetraenoic acid. 4,883,613, Cl. 260-408.000.

Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, to Hoffman-La Roche Inc. Phenyl substituted-2,4,6,8-nonatetraenoic acid. 4,883,614, Cl. 260-413.000.

Aiga, Hiroshi: *See*—
Takuma, Keisuke; Kuroda, Sizuo; Oyama, Tsukasa; and Aiga, Hiroshi, 4,883,611, Cl. 552-235.000.

Aiga, Tadao; and Kimura, Masoyoshi, to Kureha Chemical Industry Co., Limited. Method of arranging a form of processed meat. 4,883,677, Cl. 426-420.000.

Aiki, Kunio: *See*—
Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, 4,883,342, Cl. 350-320.000.

Air Products and Chemicals, Inc.: *See*—
Agrawa, Rakesh; Auvil, Steven R.; and Wilson, Keith B., 4,883,519, Cl. 62-39.000.

Airtech Company, Inc.: *See*—
Schmoeger, Duane A., 4,882,992, Cl. 101-424.100.

Aisan Kogyo Kabushiki: *See*—
Eitoku, Kenji; Tateishi, Mamoru; and Hayashi, Kenji, 4,884,052, Cl. 338-202.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Asada, Toru; Komuro, Kenichi; Fukumoto, Ryoichi; and Torii, Nozomu, 4,884,207, Cl. 364-431.030.
Kobayashi, Toshimitsu; Inagaki, Akio; Kobayashi, Yasuhiro; Mori, Masanori; and Sakakibara, Takashi, 4,883,448, Cl. 474-260.000.
Mochizuki, Masahiro, 4,883,041, Cl. 123-564.000.

Ajmera, Prakash R., to Owens-Illinois Plastic Products Inc. Heat set method for oval containers. 4,883,631, Cl. 264-528.000.

Akagawa, Minoru, to Intelmatec Corporation. End effector for IC chip handling. 4,883,300, Cl. 294-2.000.

Akahori, Takashi: *See*—
Takahashi, Junichi; Kosaka, Daisuke; Eguchi, Hirotoshi; Matsumoto, Shoji; Akahori, Takashi; Yamazaki, Hiroshi; and Izumi, Kouji, 4,884,051, Cl. 338-4.000.

Akebono Brake Industry Co., Ltd.: *See*—
Shimanuki, Haruki; Maki, Takao; and Takahashi, Yoshio, 4,883,325, Cl. 303-96.000.

Akerlund & Rausing Licens AB: *See*—
Christensson, Lars, 4,883,193, Cl. 220-266.000.

Akers, Charles K.: *See*—
Schneeberger, Richard F.; and Akers, Charles K., 4,884,076, Cl. 342-5.000.

Akeson, Richard C.: *See*—
Nagy, Gabor S.; Akeson, Richard C.; Sweenie, Richard E.; Novak, Mark E.; Malsch, Harry K.; Widule, Thomas J.; Ding, Gustav L. P.; and Jackson, Jared K., 4,882,930, Cl. 73-56.000.

Akiyama, Tatsuhiko: *See*—
Mori, Ryuichiro; Akiyama, Tatsuhiko; and Fukudome, Katsuyuki, 4,884,124, Cl. 357-72.000.

Akiyama, Toshiyuki: *See*—
Ozawa, Naoki; Akiyama, Toshiyuki; Takahashi, Kenji; Mimura, Itaru; and Nakano, Takahiro, 4,884,129, Cl. 358-44.000.

Akiyama, Yoshikazu: *See*—
Ishida, Mamoru; Inaki, Shunichi; Akiyama, Yoshikazu; and Kohata, Mitsuhiro, 4,883,766, Cl. 437-40.000.

Akiyoshi, Mitsuo: *See*—
Takano, Teruhisa; Yamasaki, Takahiko; and Akiyoshi, Mitsuo, 4,883,944, Cl. 219-492.000.

Akzo America Inc.: *See*—
Hardy, Thomas A.; and Walsh, Edward N., 4,883,891, Cl. 558-161.000.
Hardy, Thomas A.; and Walsh, Edward N., 4,883,892, Cl. 558-164.000.

ALbert Einstein College of Medicine - of Yeshiva University: *See*—
Bhargava, Kuldeep K.; Chervu, Lakshman R.; and Blaufox, M. Donald, 4,883,650, Cl. 424-1.100.
Chervu, Lakshman R.; Bhargava, Kuldeep K.; and Blaufox, M. Donald, 4,883,862, Cl. 530-331.000.

Albus, James S. Cable arrangement and lifting platform for stabilized load lifting. 4,883,184, Cl. 212-146.000.

Alder, Alex, to Ciba-Geigy Corporation. Azabicycloheptanes and process for their preparation. 4,883,877, Cl. 546-112.000.

Alender, Jeffrey R.: *See*—
Fitzgerald, Patrick H.; Rao, Nandakumar S.; Vinod, Yashavant; V.; and Alender, Jeffrey R., 4,883,839, Cl. 525-136.000.

Alesch, Edward A.: *See*—
Valentino, Frank; Betts, David E.; and Alesch, Edward A., 4,883,361, Cl. 366-97.000.

Alferness, Rodney C.; and Wood, Thomas H., to American Telephone and Telegraph Company; and AT&T Bell Laboratories. Single-mode optical fiber tap. 4,883,335, Cl. 350-96.150.

Alfred Teves GmbH: *See*—
Burgdorf, Jochen; and Weize, Lutz, 4,883,328, Cl. 303-116.000.

Allen, Gene E.: *See*—
Challoner, A. Dorian; von der Embse, U. A.; Mitchell, Mark P.; Chang, Donald C. D.; Fowell, Richard A.; Huang, Ken Y.; Hayden, Joseph H.; and Allen, Gene E., 4,883,244, Cl. 244-171.000.

Allen, Henry V.: *See*—
Ingle, Lloyd D.; Allen, Henry V.; and Knutti, James W., 4,884,223, Cl. 364-550.000.

Allen, Robert H.: *See*—
Gautreaux, Marcelian F.; and Allen, Robert H., 4,883,687, Cl. 427-213.000.

Alley, Ralph D.: *See*—
Sheridan, David S.; and Alley, Ralph D., 4,883,474, Cl. 604-280.000.

Allied-Signal Inc.: *See*—
Harpell, G. A.; Li, H. L.; Kwon, Y. D.; and Prevorsek, D. C., 4,883,700, Cl. 428-113.000.
Kwon, Young D.; Kavesh, Sheldon; and Prevorsek, Dusan C., 4,883,628, Cl. 264-178.00F.
Tsang, Peter; Rhee, Seong; Jacko, Michael; and Kubik, James, 4,883,023, Cl. 123-25.00A.

Almeras, Roland, to Societe de Prospection et d'Inventions Techniques (S.P.I.T.). Explosive diving tool apparatus with improved extractor. 4,883,213, Cl. 227-10.000.

Alps Electric Co., Ltd.: *See*—
Ide, Jun, 4,884,152, Cl. 360-78.140.
Teshirogi, Toshiyuki, 4,883,343, Cl. 350-338.000.
Uchino, Kenji; and Ohnishi, Kazumasa, 4,883,248, Cl. 248-550.000.

Aluminum Company of America: *See*—
Jacoby, John E.; Yu, Ho; and Ramser, Robert A., 4,882,831, Cl. 29-527.500.

Alvarado, Sergio I.; Crews, Alvin D., Jr.; Wepplo, Peter J.; Doehner, Robert F., Jr.; Brady, Thomas E.; Gange, David M.; and Little, Desiree L., to American Cyanamid Company. Benzenesulfonyl carboxamide compounds useful as herbicidal agents. 4,883,914, Cl. 564-91.000.

Alverson, William K.; and Ruller, James A., to Electromagnetic Sciences, Inc. Fast switching reciprocal ferrite phase shifter. 4,884,045, Cl. 333-158.000.

ALZA Corporation: *See*—
Eckenhoff, James B., 4,883,667, Cl. 424-438.000.

Amato, Joseph S.; McNamara, James M.; Leazer, Johnnie L., Jr.; Reider, Paul J.; and Reamer, Robert A., to Merck & Co. Inc. Process for unsymmetrical dithioacetals and dithioketals. 4,883,878, Cl. 546-172.000.

Amemiya, Koji: *See*—
Menjo, Takeshi; Inoue, Masahiro; and Amemiya, Koji, 4,883,019, Cl. 118-691.000.

American Biotechnology Company: *See*—
Fodor, Gabor B.; Sussangkarn, Kawporn; and Veltri, Robert W., 4,883,808, Cl. 514-468.000.
Maxim, Peter E.; and Veltri, Robert W., 4,883,813, Cl. 514-470.000.

American Cyanamid Company: *See*—
Alvarado, Sergio I.; Crews, Alvin D., Jr.; Wepplo, Peter J.; Doehner, Robert F., Jr.; Brady, Thomas E.; Gange, David M.; and Little, Desiree L., 4,883,914, Cl. 564-91.000.
Wissner, Allan; Sum, Phaik E.; and Schaub, Robert E., 4,883,816, Cl. 514-546.000.

American Home Products Corporation: *See*—
Abou-Gharbia, Magid A., 4,883,875, Cl. 546-16.000.

American Telephone and Telegraph Company: *See*—
Alferness, Rodney C.; and Wood, Thomas H., 4,883,335, Cl. 350-96.150.
Bruning, John H., 4,883,352, Cl. 353-122.000.
Miller, David A. B., 4,884,119, Cl. 357-58.000.

Amiet, Louis; and Langlois, BErnard, to Rhone-Poulenc Specialites Chimiques. Process for the preparation of ethyltrifluoroacetoacetate. 4,883,904, Cl. 560-174.000.

Amir, Shlomo. Position-adjusting and distance-measuring devices particularly useful with machine tools. 4,882,849, Cl. 33-567.000.

Ammonia Casale S.A.: *See*—
Zardi, Umberto, 4,883,646, Cl. 422-311.000.

Amoco Corporation: *See*—
Anthon, Douglas A.; and Sipes, Donald L., Jr., 4,884,277, Cl. 372-22.000.
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., 4,884,276, Cl. 372-21.000.
Huang, Chente, 4,883,886, Cl. 549-255.000.
Leung, Linus; and Rogan, John B., 4,883,847, Cl. 526-84.000.
McMahon, Patrick E., 4,883,915, Cl. 564-155.000.
Puri, Rajen; and Stein, Michael H., 4,883,122, Cl. 166-263.000.

AMP Incorporated: *See*—
Lane, David, 4,883,433, Cl. 439-607.000.

Ampferer, Herbert; and Groeger, Klaus, to Dr. Ing. h.c.F. Porsche AG. Internal combustion engine. 4,883,031, Cl. 123-195.00C.

Amy, Michael E.: *See*—
Jones, Ronald; and Amy, Michael E., 4,884,287, Cl. 375-121.000.

Analgesic Associates: *See*—
Sunshine, Abraham; and Laska, Eugene M., 4,883,818, Cl. 514-570.000.

Analog Devices, Inc.: *See*—
Mangelsdorf, Christopher W., 4,884,075, Cl. 341-159.000.

Anderson, Carl, to Anderson-Cook, Inc. Roll forming notches in a thin-wall power transmission member. 4,882,926, Cl. 72-469.000.

Anderson-Cook, Inc.: *See*—
Anderson, Carl, 4,882,926, Cl. 72-469.000.

Anderson, Jeffrey J.; Moore, John S.; Deur, Ted E.; and Roy, Joy. Manufacture of ink jet print heads by diffusion bonding and brazing. 4,883,219, Cl. 228-190.000.

Anderson, Marvin H., to Fluid Dynamics, Inc. Decanting apparatus and method. 4,883,602, Cl. 210-776.000.

Anderson, Ronald C., to Gates Energy Product, Inc. Battery terminal locking assembly. 4,883,729, Cl. 429-179.000.

Anderson, Stephen W.: *See*—
Lakey, Leroy E.; Peter, David A.; Chance, David A.; and Anderson, Stephen W., 4,883,973, Cl. 290-31.000.

Andeweg, Frits J. Light-animated graphics display. 4,882,865, Cl. 40-442.000.

Ando, Minoru: *See*—
Ichie, Tsugumi; and Ando, Minoru, 4,882,925, Cl. 72-356.000.

Ando, Takeki; Nakamura, Kiyoshi; Mine, Toshisuke; Inaba, Hiromi; Kurosawa, Toshiaki; Nakazato, Masao; and Sakai, Yoshio, to Hitachi, Ltd. Current source power converting apparatus with overvoltage protection. 4,884,182, Cl. 363-37.000.

Andreasen, Peter S. Trawler door. 4,882,870, Cl. 43-9.100.

Andrews, Peter J.: *See*—
King, Lawrence A.; and Andrews, Peter J., 4,884,039, Cl. 330-253.000.

Andriot-Ballet, Michel A.: *See*—
Pillon, Francis D.; and Andriot-Ballet, Michel A., 4,883,363, Cl. 366-157.000.

Aniuk, Lawrence M.; Dieck, Ronald L.; and Hardy, Dwayne, to Menlo Care, Inc. Polymeric article having high tensile energy to break when hydrated. 4,883,699, Cl. 428-36.900.

Annis, David: *See*—
Berry, John P.; and Annis, David, 4,883,453, Cl. 600-36.000.

Anthon, Douglas A.; and Sipes, Donald L., Jr., to Amoco Corporation. Frequency conversion of optical radiation. 4,884,277, Cl. 372-22.000.

Anthon, Douglas W.: *See*—
Dixon, George J.; Anthon, Douglas W.; and Clark, John H., 4,884,276, Cl. 372-21.000.

Anzai, Kazuo: *See*—
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; Tsuge, Akihiko; Imagawa, Hiroshi; Takano, Takeshi; Ueno, Fumio; Horiguchi, Akihiro; and Inoue, Hiroshi, 4,883,780, Cl. 501-96.000.
Sato, Hideki; Mizunoya, Nobuyuki; Asai, Hironori; Anzai, Kazuo; and Hatano, Tsuyoshi, 4,883,704, Cl. 428-209.000.

Anzai, Satoru; and Tanaka, Hiroshi, to Nikon Corporation. Projection optical apparatus. 4,883,345, Cl. 350-418.000.

Aoki, Kanemasa, to Canon Kabushiki Kaisha; and Canon Seiki Kabushiki Kaisha. Motor. 4,883,996, Cl. 310-154.000.

Aoki, Masaaki: *See*—
Nishino, Toshikazu; Miyake, Mutsuko; Kawabe, Ushio; Harada, Yutaka; Aoki, Masaaki; and Hirano, Mikio, 4,884,111, Cl. 357-05.000.

Aoki, Norihiko; and Kikuchi, Juro, to Olympus Optical Co., Ltd. Zoom lens system. 4,883,346, Cl. 350-423.000.

Aoyama, Masahide: *See*—
Nakamoto, Kouji; Morishita, Nobumichi; and Aoyama, Masahide, 4,883,821, Cl. 514-617.000.

Apfelbacher, Walter; Wiessner, Edgar; and Barnklau, Karl-Hans, to Siemens Aktiengesellschaft. Locking arrangement for two switch-gears. 4,883,927, Cl. 200-50.00C.

Apple Computer, Inc.: *See*—
Farand, Tobin E., 4,884,069, Cl. 340-799.000.

Applied Automation, Inc.: *See*—
Lacy, Robert H.; and Spencer, William A., 4,884,242, Cl. 365-229.000.

Applied Biosystems, Inc.: *See*—
Whiteley, Norman M.; Hunkapiller, Michael W.; and Glazer, Alexander N., 4,883,750, Cl. 435-6.000.

Applied Magnetics Corporation: *See*—
Roberts, Gary E.; and Reid, James, 4,884,157, Cl. 360-125.000.

Applied Thermal Systems, Inc.: *See*—
Lowry Jr., William L.; Woods, Maurice G.; and Martin, Charles A., 4,882,903, Cl. 60-39.182.

Aqualon Company: *See*—
Burdick, Charles L., 4,883,536, Cl. 106-194.000.
Burdick, Charles L., 4,883,537, Cl. 106-194.000.
Craig, Daniel H., 4,883,850, Cl. 526-200.000.

Arai, Mitutaka: *See*—
Ikeuchi, Satoru; Arai, Mitutaka; Okuyama, Yuki; Yuri, Hideki; Shiohara, Tomoo; and Oyama, Yasuhiko, 4,883,734, Cl. 430-109.000.

Arai, Susumu, to Tokico Ltd. Hydraulic shock absorber with piston rod position detecting means. 4,883,150, Cl. 188-289.000.

Arai, Tatsuo: *See*—
Tsujimura, Osamu; Arai, Tatsuo; and Okawa, Masayuki, 4,883,391, Cl. 407-40.000.

Arai, Yasunari: *See*—
Nishimoto, Hiroshi; Touge, Takashi; Okiyama, Tadashi; Kuwata, Naoki; and Arai, Yasunari, 4,884,278, Cl. 372-26.000.

Arakawa Chemical Industries, Ltd.: *See*—
Matsuo, Kohtaro; Ezaki, Youichirou; Tobe, Akihiro; Yamazaki, Satoshi; Enda, Kozue; and Kitsukawa, Mariko, 4,883,822, Cl. 514-680.000.

Arakawa, Satoshi; Hosoi, Yuichi; Takahashi, Kenji; Tamura, Kaoru; and Satome, Shigeru, to Fuji Photo Film Co., Ltd. Radiation image recording and read-out apparatus. 4,883,961, Cl. 250-327.200.

Araki, Hiroaki: *See*—
Nakatsuka, Shin-ichi; Hayashi, Masatoshi; Yokomori, Sadakazu; Nakashima, Yoshimoto; Hatayama, Katsuo; and Araki, Hiroaki, 4,883,876, Cl. 546-51.000.

Arch Development Corporation: *See*—
Claar, Terry D.; Busch, Donald E.; and Picciolo, John J., 4,883,497, Cl. 29-623.500.

Arco Chemical Technology, Inc.: *See*—
Shawl, Edward T.; Kesling, Haven S., Jr.; and Liotta, Frank J., Jr., 4,883,908, Cl. 560-344.000.

Argyropoulos, John N.; Derderian, Edmond J.; Keen, Brian T.; and Bumgardner, Timothy G., to Union Carbide Corporation. Production of trisubstituted hydroxyalkyl alkanoates from aldehydes. 4,883,906, Cl. 560-238.000.

Arima, Junichi: *See*—
Mochizuki, Hiroshi; Tamaki, Reiji; Arima, Junichi; Ikegami, Masaaki; Tanaka, Eisuke; and Saito, Kenji, 4,884,120, Cl. 357-68.000.

Arimoto, Shinobu; and Muramatsu, Masanori, to Canon Kabushiki Kaisha. Image signal processing system. 4,884,147, Cl. 358-443.000.

Arino, Masao; and Takase, Jinki, to Jidosha Kiki Co., Ltd. Tandem brake booster. 4,882,980, Cl. 92-48.000.

Armco Advanced Materials Corporation: *See*—
Schoen, Jerry W., 4,882,834, Cl. 29-605.000.

Armco Inc.: *See*—
Kilbane, Farrell M.; Coleman, Richard A.; Dunbar, Frank C.; and Gibson, Alan F., 4,883,723, Cl. 428-653.000.

Armstrong, Eric J.; and McClanahan, David D., to Knoll International, Inc. Spine assembly. 4,883,330, Cl. 312-195.000.

Arnold, Johann. Transport ventilator. 4,883,406, Cl. 415-183.000.

Arrowin Limited: *See*—
Bradley, Dennis, 4,883,313, Cl. 296-216.000.

Arval S.p.A.: *See*—
Zappia, Vincenzo; and De Rosa, Mario, 4,883,670, Cl. 424-450.000.

Asada, Katsuhiko: *See*—
Terada, Hiroaki; Asada, Katsuhiko; Nishikawa, Hiroaki; Miyata, Souichi; Asano, Hajime; Shimizu, Masahisa; Shima, Kenji; and Komori, Shinji, 4,884,192, Cl. 364-200.000.

Asada, Toru; Komuro, Kenichi; Fukumoto, Ryoichi; and Torii, Nozomu, to Aisin Seiki Kabushiki Kaisha. Start controller for engine. 4,884,207, Cl. 364-431.030.

Asahi Corporation: *See*—
Kobayashi, Toshio, 4,883,273, Cl. 273-110.000.

Asahi Glass Company Ltd.: *See*—
Kawakami, Keiichi; Takabatake, Mitsuo; and Chiba, Jiro, 4,883,705, Cl. 428-209.000.

Asahi Kogaku Kogyo K.K.: *See*—
Kawasaki, Harumi; and Hara, Masato, 4,883,955, Cl. 250-231.0SE.

Asai, Hironori: *See*—
Sato, Hideki; Mizunoya, Nobuyuki; Asai, Hironori; Anzai, Kazuo; and Hatano, Tsuyoshi, 4,883,704, Cl. 428-209.000.

Asai, Takayasu: *See*—
Abe, Tomiya; Shimazaki, Yukio; Ishibashi, Takanobu; Abe, Norimoto; Asai, Takayasu; and Taketani, Noriaki, 4,883,338, Cl. 350-96.340.

Asano, Hajime: *See*—
Terada, Hiroaki; Asada, Katsuhiko; Nishikawa, Hiroaki; Miyata, Souichi; Asano, Hajime; Shimizu, Masahisa; Shima, Kenji; and Komori, Shinji, 4,884,192, Cl. 364-200.000.

Asano, Kuniyoshi: *See*—
Iwanami, Teruo; Moriyama, Takamasa; and Asano, Kuniyoshi, 4,883,696, Cl. 428-35.400.

Asano, Seiji: *See*—
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,884,087, Cl. 354-75.000.

Asano, Taiji: *See*—
Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, 4,883,879, Cl. 546-280.000.

Asaoka, Teruo: *See*—
Kuwabara, Yohei; and Asaoka, Teruo, 4,883,568, Cl. 204-129.430.

ASC Incorporated: *See*—
Tokarz, Stephen P., 4,883,940, Cl. 219-203.000.

Aschwenden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, to Hoffmann-La Roche Inc. Hydrocinnamic acid derivatives. 4,883,815, Cl. 514-541.000.

Asea Brown Boveri AG: *See*—
Hausler, Michael, 4,884,025, Cl. 324-158.0SC.
Kohl, Gerhard; and Christiansen, Mogens B., 4,883,427, Cl. 439-64.000.

Ashimori Industry Co., Ltd.: *See*—
Morinaga, Akio; Yagi, Isaburo; Maruyama, Hideo; and Yamamoto, Akifumi, 4,883,557, Cl. 156-287.000.

Aspen Peripherals Corp.: *See*—
Rather, Howard H., 4,884,274, Cl. 371-57.200.

Asten Group, Inc.: *See*—
Dufour, Marcel, 4,883,097, Cl. 139-383.00A.
Penven, Patrick H., 4,883,096, Cl. 139-383.00A.

Astheimer, Robert W., to Barnes Engineering Company. Apparatus for accurately measuring temperature of materials of variable emissivity. 4,883,364, Cl. 374-129.000.

Astley, Graham J.: *See*—
Belanger, James A.; Wentworth, Robert J.; Turner, Barry S.; and Astley, Graham J., 4,882,826, Cl. 29-527.100.

AT&T Bell Laboratories: *See*—
Alferness, Rodney C.; and Wood, Thomas H., 4,883,335, Cl. 350-96.150.
Miller, David A. B., 4,884,119, Cl. 357-58.000.

Atherton, James H.; and Stanojevic, Silvo, to Honeywell, Inc. Integrated circuit voltage regulator with transient protection. 4,884,161, Cl. 361-18.000.

Atlantic Richfield Company: *See*—
Schasteen, Thomas; and Smith, Lonnie J., 4,883,120, Cl. 166-98.000.
Wilson, William N.; Miles, Leon H.; Boyd, Brett H.; and Carpenter, Robert B., 4,883,125, Cl. 166-291.000.

ATOCHEM: *See*—
Audry, Richard; Krempf, Gerard; and Perono, Jackie, 4,883,859, Cl. 528-484.000.

Atsumi, Shigeru: *See*—
Tanaka, Sumio; Atsumi, Shigeru; and Saito, Shinji, 4,884,241, Cl. 365-210.000.

Atwal, Karnail, to E. R. Squibb & Sons, Inc. 3-oxo-1,2,4-triazolo(4,3-A) pyrimidine-6-carboxylic acid esters. 4,883,872, Cl. 544-263.000.

Au Coin, Thomas R.; Braddock IV, Walter D.; and Iafrate, Gerald J., to United States of America, Army. Method of making a multidimensional quantum-well array. 4,883,769, Cl. 437-110.000.

Audry, Richard; Krempf, Gerard; and Perono, Jackie, to ATOCHEM. Process for producing hydroxylated polybutadiene. 4,883,859, Cl. 528-484.000.

August, Melvin C.; Neumann, Eugene F.; Bowen, Stephen A.; and Williams, John T., to Cray Research, Inc. Cooling plate with interboard connector apertures for circuit board assemblies. 4,884,168, Cl. 361-382.000.

Austin, George K., Jr.; and Parlier, Mathew H., to A-Dec, Inc. Dental instrument delivery system. 4,883,316, Cl. 297-191.000.

Automatic Handling, Inc.: *See*—
Pienta, David J., 4,882,892, Cl. 53-176.000.

Automatic Tool Control and Management Systems, Inc.: *See*—
Sagi, Nehemia, 4,883,939, Cl. 219-125.100.

Automatik Machinery Corporation: *See*—
Nagy, Gabor S.; Akeson, Richard C.; Sweenie, Richard E.; Novak, Mark E ; Malsch, Harry K.; Widule, Thomas J.; Ding, Gustav L. P.; and Jackson, Jared K., 4,882,930, Cl. 73-56.000.

Automatismes Energie Electronique Systemes: *See*—
Budin, Maurice; and Veyrand, Pierre, 4,884,187, Cl. 363-141.000.

Automotive Products plc: *See*—
Mabee, Brian D.; and Leigh-Monstevens, Keith V., 4,883,037, Cl. 123-399.000.

Auvil, Steven R.: *See*—
Agrawa, Rakesh; Auvil, Steven R.; and Wilson, Keith B., 4,883,519, Cl. 62-39.000.

Axytel S.A.: *See*—
Genevois, Christophe, 4,884,061, Cl. 340-550.000.

Aziz, Farooq. Remedial device for treatment of carpal tunnel syndrome. 4,883,073, Cl. 128-878.000.

Azukizawa, Teruo; Morishita, Mimpei; Yokoyama, Toyohiko; Takaki, Shigeo; Yuyama, Yoshio; and Noda, Akitaka, to Kabushiki Kaisha Toshiba. Transportation system of a floated-carrier type. 4,882,999, Cl. 104-281.000.

Azuma, Toshiro: *See—*
Yamaoka, Kojiro; Azuma, Toshiro; Fujisaki, Koichiro; and Okada, Hideaki, 4,882,940, Cl. 74-15.661.

B. A. Barker. Animal waterer. 4,883,022, Cl. 119-73.000.

B. Braun Melsungen AG: *See—*
Haindl, Hans, 4,883,470, Cl. 604-192.000.

B.F. Goodrich Company, The: *See—*
Riew, Changkiu K.; and Morris, Roger E., 4,883,841, Cl. 525-148.000.

B-V Dough Handling Systems, Inc.: *See—*
Valentino, Frank; Betts, David E.; and Alesch, Edward A., 4,883,361, Cl. 366-97.000.

Baader North America Corporation: *See—*
Ewing, Richard C., 4,882,811, Cl. 17-58.000.

Baba, Sueki: *See—*
Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Ohtsuchi, Tetsuro; and Watanabe, Masanori, 4,883,967, Cl. 250-370.010.

Baba, Toru, to Kioritz Corporation. Structure of a head of a flexible filament type grass trimmer. 4,882,843, Cl. 30-276.000.

Baba, Yukihisa: *See—*
Hashimoto, Masashi; Oku, Teruo; Ito, Yoshikuni; Namiki, Takayuki; Sawada, Kozo; Kasahara, Chiyoshi; and Baba, Yukihisa, 4,883,800, Cl. 514-259.000.

Babcock, Walter C.: *See—*
Friesen, Dwayne T.; and Babcock, Walter C., 4,883,593, Cl. 210-500.320.

Babel, Bernard: *See—*
Mamin, Pierre-Alexandre; Babel, Bernard; and Balleys, Francois, 4,883,934, Cl. 219-69.120.

Bacigalupe, Carlos; and Dobie, Michael J., to Stewart Systems, Inc. Continuous proof and bake apparatus having improved conveyor system. 4,882,981, Cl. 99-479.000.

Bacon, Walter H., to Custom products Corporation. Winch handle. 4,883,255, Cl. 254-266.000.

Bader, Eugen: *See—*
Fetzer, Gerhard; and Bader, Eugen, 4,882,812, Cl. 19-112.000.

Baginski, Pierre; Nebon, Jean-Pierre; and Bur, Marc, to Merlin Gerin. High rating multipole circuit breaker formed by two adjoined molded cases. 4,884,047, Cl. 335-10.000.

Baker, Gordon D.: *See—*
Gossen, Richard N., Jr.; Bruncke, William C.; and Baker, Gordon D., 4,883,543, Cl. 437-37.000.

Balanyk, Thomas E.: *See—*
Sandham, H. J.; and Balanyk, Thomas E., 4,883,534, Cl. 106-35.000.

Baldwin, Clifton: *See—*
Wolf, Isobel T.; and Baldwin, Clifton, 4,883,282, Cl. 280-43.240.

Baldwin, John J.; and Ponticello, Gerald S., to Merck & Co., Inc. 1-aryloxy-3-(substituted alkylamino)-2-propanols and use as β-blocker. 4,883,814, Cl. 514-524.000.

Baldwin, Richard R., to Hewlett-Packard Company. Stylus switch. 4,883,926, Cl. 178-18.000.

Baliga, Bantval J.: *See—*
Gray, Peter V.; Baliga, Bantval J.; Chang, Mike F. S.; and Pifer, George C., 4,883,767, Cl. 437-41.000.

Balleys, Francois: *See—*
Mamin, Pierre-Alexandre; Babel, Bernard; and Balleys, Francois, 4,883,934, Cl. 219-69.120.

Bamberger, Carlos E., to United States of America, Energy. Process for making transition metal nitride whiskers. 4,883,559, Cl. 156-603.000.

Bantjes, Adriaan: *See—*
Riethorst, Waander; Konig, Bondewyn W.; van Aken, Willem G.; Bantjes, Adriaan; Beugeling, Tom; and Te Booy, Marcelinus P. W. M., 4,883,598, Cl. 210-656.000.

Banyu Pharmaceutical Co., Ltd.: *See—*
Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, 4,883,868, Cl. 540-222.000.

Barakitis, Nikolaos; and Zaslavsky, Gregory, to GTE Products Corporation. Method of making glow discharge starter. 4,882,835, Cl. 29-622.000.

Barnard, Jan H. Track-laying device. 4,882,947, Cl. 74-687.000.

Barnes Engineering Company: *See—*
Astheimer, Robert W., 4,883,364, Cl. 374-129.000.

Barnklau, Karl-Hans: *See—*
Apfelbacher, Walter; Wiessner, Edgar; and Barnklau, Karl-Hans, 4,883,927, Cl. 200-50.00C.

Barre, Daniel: *See—*
Bollinger, Karl; and Barre, Daniel, 4,883,134, Cl. 175-96.000.

Barrows, Thomas H., to Minnesota Mining and Manufacturing Company. Absorbable nerve repair device and method. 4,883,618, Cl. 264-49.000.

Bartch, Donald W.: *See—*
Deal, Samuel B.; and Bartch, Donald W., 4,884,004, Cl. 313-402.000.

Barth, John M., to Hoover Universal, Inc. Container with base cup and projection to limit stacking of base cups. 4,883,188, Cl. 215-12.100.

Barth, Phillip W.: *See—*
Petersen, Kurt E.; and Barth, Phillip W., 4,882,933, Cl. 73-517.00R.

Barthel, Jean-Pierre: *See—*
Stomp, Hubert; Barthel, Jean-Pierre; Feitler, Albert; and Parasch, Fred, 4,883,259, Cl. 266-217.000.

Barthelemy, Pascal; and Crochemore, Michel, to Rhone-Poulenc Chimie. Novel n[meth]allyloxy(meth)allylphenyl]maleimides and thermosetting imido copolymers prepared therefrom. 4,883,883, Cl. 548-549.000.

Barton, Donald L.: *See—*
Conley, Richard A.; and Barton, Donald L., 4,883,787, Cl. 564-414.000.

Barton, Kenneth R.: *See—*
Stocki, Rebecca R.; Barton, Kenneth R.; and Caldwell, Melvin A., 4,883,714, Cl. 428-412.000.

BASF Aktiengesellschaft: *See—*
Leyrer, Reinhold; and Neumann, Peter, 4,883,732, Cl. 430-49.000.
Schwalm, Reinhold; Boettcher, Andreas; and Binder, Horst, 4,883,740, Cl. 430-270.000.
Von Maessenhausen, Walter; Czikkely, Vilmos; and Jung, Johann, 4,883,530, Cl. 71-36.000.
Voss, Hartwig; and Bruecken, Thomas, 4,883,573, Cl. 204-182.400.
Wallbillitch, Guenter; and Van Heuvelen, Jan H., 4,883,742, Cl. 430-275.000.

BASF Lacke & Farben AG: *See—*
Jung, Werner; and Sievers, Axel, 4,883,838, Cl. 525-119.000.

Basson, Rochford R.; Tinder, David V.; and Wooldridge, George A., to United Technologies Automotive, Inc. Method of simplifying on-line assembly of vehicular door components. 4,882,842, Cl. 29-857.000.

Batllo, Francois: *See—*
Freund, Friedemann; and Batllo, Francois, 4,884,031, Cl. 324-459.000.

Battenfeld Fischer Blasformtechnik GmbH: *See—*
Langecker, Gunter, 4,883,630, Cl. 264-513.000.

Batteux, Pierre; and Nereau, Jean-Pierre, to Merlin Gerin. High pressure arc extinguishing chamber. 4,883,931, Cl. 200-148.00R.

Baumeister, Willi: *See—*
Boedecker, Manfred; Benecke, Thomas; Krucke, Werner; and Baumeister, Willi, 4,883,913, Cl. 564-2.000.

Baus, Heinz G. Partition, more particularly for a corner shower. 4,882,795, Cl. 4-607.000.

Bautista, Richard L., to Raychem Corporation. Connector for electrical heater. 4,883,945, Cl. 219-541.000.

Baxter, James E.; and Poole, Robert D., to Royal Ordnance plc. Tubular projectiles. 4,882,997, Cl. 102-503.000.

Baxter Travenol Laboratories, Inc.: *See—*
Williamson, Warren P.; and Schoendorfer, Donald W., 4,883,462, Cl. 604-53.000.

Bayer Aktiengesellschaft: *See—*
Buysch, Hans-Josef; Schon, Norbert; Kress, Hans-Jurgen; Eichenauer, Herbert; and Buekers, Josef, 4,883,835, Cl. 524-504.000.
Hees, Bruno; and Hoffmann, Hans, 4,883,565, Cl. 204-180.200.

BBC Brown Boveri AG: *See—*
Perevuznik, Josef; Spinnler, Fritz; and Weber, Jurg, 4,883,413, Cl. 418-55.000.

Beaman, Donald R.: *See—*
Pyzik, Aleksander J.; Dubensky, William J.; Schwarz, Douglas B.; and Beaman, Donald R., 4,883,776, Cl. 501-10.000.

Beaulieu, William B.: *See—*
O'Connor, James E.; Beever, William H.; Dancer, Jeffrey W.; Beaulieu, William B.; Selby, Larry M.; and Rhodes, Virgil H., Jr., 4,883,552, Cl. 156-180.000.

Beck, H. Kent: *See—*
Zunkel, Gary D.; Beck, H. Kent; and Christensen, Jon B., 4,883,123, Cl. 166-264.000.

Beck, Ivan: *See—*
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Szirt nee Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Jakfalvi, Elemer; Zukovics nee Sumeg, Katalin; Gado, Klara; and Hegedus, Maria, 4,883,798, Cl. 514-256.000.

Becker, Klaus: *See—*
Ostholt, Rudiger; Wahrmann, Jorg; and Becker, Klaus, 4,882,810, Cl. 17-11.000.

Becker, Reinhard; and Jansa, Bruno, to Messerschmitt-Boelkow-Blohm GmbH. Packing sack for a life jacket and its easy access storage, especially in an aircraft. 4,883,242, Cl. 244-118.500.

Becton, Dickinson and Company: *See—*
Lee, Linda G.; and Chen, Chia-Huei, 4,883,867, Cl. 536-28.000.

Bedis, Michael: *See—*
Wanie, Lee J.; Behrens, Robert N.; DeBraal, Stanley J.; and Bedis, Michael, 4,883,137, Cl. 180-6.340.

Bednarski, Joseph W.: *See—*
Dawson, John F.; Bednarski, Joseph W.; Stoffer, Marie A.; and Cousens, James A., 4,884,220, Cl. 364-521.000.

Beecham Group plc. of Beecham House: *See—*
King, Francis D.; Hadley, Michael S.; and Martin, Roger T., 4,883,874, Cl. 544-47.000.

Beever, William H.: *See—*
O'Connor, James E.; Beever, William H.; Dancer, Jeffrey W.; Beaulieu, William B.; Selby, Larry M.; and Rhodes, Virgil H., Jr., 4,883,552, Cl. 156-180.000.

Beghetto, Leonardo: *See—*
Orlando, Crescenzo; Zenere, Sandro; Butera, Antonio; and Beghetto, Leonardo, 4,883,386, Cl. 405-136.000.

Beghin-Say, S.A.: *See—*
Lerailler, Eric; Pierre, Michel; Thiriet, Bernard; and Wacquez, Jean, 4,883,478, Cl. 604-360.000.

Behrens, Robert N.: *See*—
Wanie, Lee J.; Behrens, Robert N.; DeBraal, Stanley J.; and Bedis, Michael, 4,883,137, Cl. 180-6.340.

Beierle, Frederick P.; and Mazzawi, Mounir. Process adapted to produce synthesis gas and activated carbon from organic input material. 4,883,499, Cl. 48-203.000.

Belaich, Jean-Pierre; Fardeau, Marie-Laure; Peillex, Jean-Paul; and Pavia, Andre , to Gaz De France. High-yield methane production process by culture of *Methanobacterium thermoautotrophicum or any other methanogenic bacterium having the same physiological growth properties*. 4,883,753, Cl. 435-167.000.

Belanger, Inc.: *See*—
Belanger, James A.; Wentworth, Robert J.; Turner, Barry S.; and Astley, Graham J., 4,882,826, Cl. 29-527.100.

Belanger, James A.; Wentworth, Robert J.; Turner, Barry S.; and Astley, Graham J., to Belanger, Inc. Method of making a unit blower housing. 4,882,826, Cl. 29-527.100.

Belasco, David. Multi-pass fluid treating device. 4,883,591, Cl. 210-223.000.

Bell Communications Research, Inc.: *See*—
Gmitter, Thomas J.; and Yablonovitch, Eli, 4,883,561, Cl. 156-633.000.

Beller, Frank W., to Belson Manufacturing Co., Inc. Roll and load rotisserie assembly. 4,882,985, Cl. 99-426.000.

Bellis, Kenneth E.; Brown, Jackson E.; Nagarwalla, Pheroze J.; Niedermeyer, William; and Pawlak, Paul, to Roberts Corporation. Method and apparatus for bonding pairs of mold shells into molds. 4,883,558, Cl. 156-292.000.

Beloit Corporation: *See*—
Wedel, Gregory L.; and Chance, J. Larry, 4,882,854, Cl. 34-115.000.

Belson Manufacturing Co., Inc.: *See*—
Beller, Frank W., 4,882,985, Cl. 99-426.000.

Belvederi, Bruno, to G.D Societa' per Azioni. Dual-rod cigarette manufacturing machine. 4,883,076, Cl. 131-84.400.

Bend Research, Inc.: *See*—
Friesen, Dwayne T.; and Babcock, Walter C., 4,883,593, Cl. 210-500.320.

Bender, Bernhard: *See*—
Hazelett, S. Richard; Bender, Bernhard; and Savage, John V., 4,883,283, Cl. 280-204.000.

Bendix Electronics S.A.: *See*—
Mate, Jean-Luc, 4,884,206, Cl. 364-431.080.

Benecke, Thomas: *See*—
Boedecker, Manfred; Benecke, Thomas; Krucke, Werner; and Baumeister, Willi, 4,883,913, Cl. 564-2.000.

Benko, Pal: *See*—
Ratz nee Simonek, Ildiko; Benko, Pal; Berenyi nee Foldermann, Edit; and Magyar, Karoly, 4,883,907, Cl. 560-24.000.

Benn, Malcolm; Grint, Alan; Proud, Graeme P.; and Rand, Brian, to British Petroleum Company p.l.c., The. Method of forming binderless carbon materials. 4,883,617, Cl. 264-29.700.

Benner, Robert L. Grinding wheel. 4,882,878, Cl. 51-206.00R.

Benoit, Gordon L., to Mobil Oil Corp. Process for making single side free plastic bag. 4,883,450, Cl. 493-196.000.

Benz, Dieter. Electric toothbrush. 4,882,801, Cl. 15-23.000.

Berenyi nee Foldermann, Edit: *See*—
Ratz nee Simonek, Ildiko; Benko, Pal; Berenyi nee Foldermann, Edit; and Magyar, Karoly, 4,883,907, Cl. 560-24.000.

Berg, Allan L.: *See*—
Foster, Atwood P.; and Berg, Allan L., 4,883,258, Cl. 266-148.000.

Berg, Jon A.: *See*—
Langlie, Ronald H.; and Berg, Jon A., 4,883,923, Cl. 174-158.00F.

Bergman, Larry A.: *See*—
Johnston, Alan R.; Nixon, Robert H.; Bergman, Larry A.; and Esener, Sadik, 4,884,243, Cl. 365-234.000.

Berkeley, Michael E.: *See*—
Purnell, Mark L.; Oden, Robert R.; McCune, William L.; and Berkeley, Michael E., 4,883,048, Cl. 128-92.0VD.

Berkhout, Ronald; Van Stiphout, Johannes G. V.; Corver, Jozef; A. W. M.; Hoep, Antoon L.; and Knapen, Berend J., to Oce-Nederland B.V. Magnetic roller means with stationary magnetic knife blade for use in printing devices. 4,884,188, Cl. 346-160.100.

Bernard, Thomas E.; Sherwin, Gary W.; Kenney, William L., Jr.; and Lewis, Debra A., to Electric Power Research Institute, Inc. Personal monitor and process for heat and work stress. 4,883,063, Cl. 128-670.000.

Bernhard, Kurt; Jaggli, Stephan; Kreienbuhl, Paul; and Schwieter, Ulrich, to Hoffmann-La Roche Inc. Sulfone polyene intermediates. 4,883,887, Cl. 549-341.000.

Berry, John P.; and Annis, David, to Ethicoh Inc.; and University of Liverpool, The. Method of manufacturing synthetic vascular grafts. 4,883,453, Cl. 600-36.000.

Bertke, James H.: *See*—
Reigel, James R.; Corsmeier, Robert J.; Bertke, James H.; and Lenahan, Dean T., 4,882,902, Cl. 60-39.750.

Bertling, Hannes: *See*—
Abbing, Andreas; Bertling, Hannes; Kehl, George; Mergenthaler, Robert; Rischen, Dietmar; Schafer, Ernst-Dieter; Schmitt, Edgar; and Siegel, Heinz, 4,882,976, Cl. 91-376.00R.

Berz, Gerhard, to Sms Schloemann-Siemag Aktiengesellschaft. Wire reel. 4,883,237, Cl. 242-83.000.

Bessler, Edward W. Mouth appliance for assisting in weight control. 4,883,072, Cl. 128-857.000.

Beth Israel Hospital: *See*—
Simon, Morris, 4,883,053, Cl. 128-303.00B.

Betts, David E.: *See*—
Valentino, Frank; Betts, David E.; and Alesch, Edward A., 4,883,361, Cl. 366-97.000.

Betz Laboratories, Inc.: *See*—
Muccitelli, John A.; and Feldman, Nancy A., 4,883,566, Cl. 204-1.00T.
Roling, Paul V.; and Niu, Joseph H. Y., 4,883,580, Cl. 208-48.0AA.

Beugeling, Tom: *See*—
Riethorst, Waander; Konig, Bondewyn W.; van Aken, Willem G.; Bantjes, Adriaan; Beugeling, Tom; and Te Booy, Marcelinus P. W. M., 4,883,598, Cl. 210-656.000.

Bexten, Daniel P.: *See*—
Mitchell, James L.; and Bexten, Daniel P., 4,883,446, Cl. 474-133.000.

Bexten, Ludger: *See*—
Hobes, John; Payer, Wolfgang; and Bexten, Ludger, 4,883,853, Cl. 526-329.000.

Beyl, Jean J. Pedal for a bicycle or similar device. 4,882,946, Cl. 74-594.600.

Bhargava, Kuldeep K.; Chervu, Lakshman R.; and Blaufox, M. Donald, to ALbert Einstein College of Medicine - of Yeshiva University. Radioidohippuric acid ester, a conjugate thereof, and methods of making the same. 4,883,650, Cl. 424-1.100.

Bhargava, Kuldeep K.: *See*—
Chervu, Lakshman R.; Bhargava, Kuldeep K.; and Blaufox, M. Donald, 4,883,862, Cl. 530-331.000.

Bhatt, Bharat K.: *See*—
Perry, John H., Jr.; Bhatt, Bharat K.; Capps, Jesse; Eldridge, Paul M.; Greiner, Leonard; Lockyer, Robert W.; Martin, Michelle; McNeice, Raymond R.; Misiaszek, Steven M.; Perry, Stanton S.; Sullivan, Thomas F.; and Campbell, Paul G., 4,883,823, Cl. 518-702.000.

Biberian, Jean P. Electron-emitting device and its application particularly to making flat television screens. 4,884,010, Cl. 315-366.000.

Bida, Sam. Plaque and method of making same. 4,883,554, Cl. 156-219.000.

Bienert, Horst: *See*—
Kohlpaintner, Georg; and Bienert, Horst, 4,883,311, Cl. 296-213.000.

Bierman, Laurence W.; Polinsky, Samuel M.; and Humberger, Roger B., to J. R. Simplot Co. Process for beneficiating ores containing fine particles. 4,883,586, Cl. 209-167.000.

Biervert, Klaus: *See*—
Zabinski, Siegfried; Biervert, Klaus; and Kupper, Gerd, 4,882,961, Cl. 83-177.000.

Billy Pugh Company, Inc.: *See*—
Pugh, Billy G., 4,883,301, Cl. 294-77.000.

Binder, Horst: *See*—
Schwalm, Reinhold; Boettcher, Andreas; and Binder, Horst, 4,883,740, Cl. 430-270.000.

BioResearch, Inc.: *See*—
Kurtz, Leonard D.; and LiCausi, Joseph, 4,883,476, Cl. 604-323.000.

Birdsall, Frank O.: *See*—
Morris, James A.; Morris, Terry F.; and Birdsall, Frank O., 4,884,132, Cl. 358-93.000.

Bisconte, Jean-Claude, to Universite Paris-Nord. Means to automatically hold, process, store and analyze biological samples. 4,883,642, Cl. 422-66.000.

Bishop, Roy G. Voltage testing device attachable to the blade terminals of a power meter. 4,884,022, Cl. 324-157.000.

Bito, Laszlo Z., to Columbia University in the City of New York, The Trustees of. Use of A, B and C prostaglandins and derivatives thereof to treat ocular hypertension and glaucoma. 4,883,819, Cl. 514-573.000.

Blackburn, Bruce N., to Weinstein, Bernard. Dial face for clock or watch. 4,884,256, Cl. 368-223.000.

Blackman, Steven T.; and Ralske, Irene, to Thames Pharmacal Co., Inc. Gel bases for pharmaceutical compositions. 4,883,660, Cl. 424-78.000.

Blaimschein, Gottfried, to GFM Gesellschaft fur Fertigungstechnik und Maschinenbau Gesellschaft m.b.H. Method and machine for a balancing centering of workpieces which are to be machined only at certain portions, particularly crankshafts. 4,884,210, Cl. 364-474.010.

Blakeslee, Thomas R., to Orion Instruments, Inc. Phase detection system. 4,884,020, Cl. 324-83.00D.

Blanchard, JoAnn. Adjustable disposable panty. 4,883,481, Cl. 604-385.100.

Blankenhagen, Fred; and Putz, Hermann, to Enfo Grundlagenforschungs AG. Method and device for producing a friction or rubbing element. 4,883,638, Cl. 419-9.000.

Blaufox, M. Donald: *See*—
Bhargava, Kuldeep K.; Chervu, Lakshman R.; and Blaufox, M. Donald, 4,883,650, Cl. 424-1.100.
Chervu, Lakshman R.; Bhargava, Kuldeep K.; and Blaufox, M. Donald, 4,883,862, Cl. 530-331.000.

Bloebaum, Roy D.; Magee, Frank P.; and Murray, Thomas P., to Harrington Arthritis Research Center. Tibial component for a knee prosthesis. 4,883,488, Cl. 62.3-20.000.

Blumenthal, Gunter; Kunzer, Heinz; and Plaga, Kurt, to Bochumer Eisenhutte Heintzmann GmbH & Co. KG. Mining and conveying apparatus. 4,883,322, Cl. 299-34.000.

Board of Regents, The University of Texas System: *See*—
Pak, Charles Y. C.; Uskokovic, Milan R.; and Zerwekh, Joseph E., 4,883,791, Cl. 514-167.000.

BOC Group, Inc., The: *See*—
Layland, David J.; and Lavin, John T., 4,883,516, Cl. 62-22.000.

Rathbone, Thomas, 4,883,517, Cl. 62-22.000.

Bochumer Eisenhutte Heintzmann GmbH & Co. KG: *See*—
Blumenthal, Gunter; Kunzer, Heinz; and Plaga, Kurt, 4,883,322, Cl. 299-34.000.

Bock, Erich; and Himmert, Rainer, to Diehl GmbH & Co. Explosive projectile assembly with a projectile body. 4,882,996, Cl. 102-496.000.

Bock, Wojtek; and Chrostowski, Jacek, to Conseil National de Recherches du Canada. Method and leadthrough system for laying out optical fibres across an aperture of a container shell. 4,883,336, Cl. 350-96.200.

Boden, Richard M.; and McGhie, Joseph A., to International Flavors & Fragrances Inc. Tetrahydro-5-isopropyl-2-methyl-2-thiophene acetonitrile, organoleptic uses thereof and process for preparing same. 4,883,884, Cl. 549-74.000.

Bodine, Albert G. Sonic method for facilitating the extraction of minerals from ore in a leachant. 4,883,532, Cl. 75-101.00R.

Boedecker, Manfred; Benecke, Thomas; Krucke, Werner; and Baumeister, Willi, to Kali-Chemie Aktiengesellschaft. Stabilization of chlorofluoroalkanes. 4,883,913, Cl. 564-2.000.

Boeing Company, The: *See*—
Herndon, Gerald F., 4,883,243, Cl. 244-122.00R.

Boenig Company, The: *See*—
Jensen, David G., 4,883,971, Cl. 250-495.100.

Boettcher, Andreas: *See*—
Schwalm, Reinhold; Boettcher, Andreas; and Binder, Horst, 4,883,740, Cl. 430-270.000.

Bogart, Larry; Hipkins, James J.; and Smith, Morris L., to Scott Paper Company. Chemically treated paper products—towel and tissue. 4,883,475, Cl. 604-290.000.

Bogers, Antonius J. P.: *See*—
Gielis, Gerardus C. M.; Bogers, Antonius J. P.; and Van Lerberghe, Steven J. W., 4,884,230, Cl. 364-724.150.

Bohman, Carl E., to Ford New Holland, Inc. Optical method and apparatus for discriminating between crop stalks and weed stalks in a non-contact row crop harvester guidance system. 4,883,964, Cl. 250-341.000.

Bohman, Carl E., to Ford New Holland, Inc. Method and apparatus for discriminating between stalks and leaves in a non-contact row crop harvester guidance system. 4,883,965, Cl. 250-341.000.

Bohmig, Wolfgang, to Zeutschel GmbH & Company. Apparatus for the development especially of a film sheet of a film punched card. 4,884,093, Cl. 354-299.000.

Bolli, Peter, to Interlego A.G. Electrified toy building block with zig-zag current carrying structure. 4,883,440, Cl. 446-91.000.

Bollinger, Karl, to Soletanche. Excavating bucket having scoops. 4,882,859, Cl. 37-187.000.

Bollinger, Karl; and Barre, Daniel, to Soletanche. Milling machine for cutting trenches. 4,883,134, Cl. 175-96.000.

Bonar, George D. Bumper. 4,883,299, Cl. 293-110.000.

Bonnefous, Odile M. A.: *See*—
Pesque, Patrick R.; and Bonnefous, Odile M. A., 4,883,060, Cl. 128-660.010.

Boone, David D., to Lynx Golf, Inc. Gold club iron head. 4,883,275, Cl. 273-172.000.

Booth, Bruce L.; and Marchegiano, Joseph E., to Du Pont de Nemours, E. I., and Company. Optical fiber connector assemblies and methods of making the assemblies. 4,883,743, Cl. 430-321.000.

Boothroyd, William A.; Camann, James C.; and Palo, Robert A., to International Business Macines Corporation. User transaction guidance. 4,884,199, Cl. 364-408.000.

Borcherding, Gary W., to Emerson Electric Co. Motor fan retention on a non-stepped shaft. 4,883,408, Cl. 416-93.00R.

Borchers, Peter: *See*—
Sansevero, Frank M.; Seehausen, Klaus; Rivera, James A.; Nguyen, Dat; and Borchers, Peter, 4,883,160, Cl. 198-328.000.

Borer, John W.: *See*—
Enk, Allan T.; Wolfe, Jennifer R.; and Borer, John W., 4,883,526, Cl. 65-104.000.

Borland, James E.: *See*—
Smith, Kim R.; Sauer, Joe D.; and Borland, James E., 4,883,917, Cl. 564-292.000.

Borzatta, Valerio: *See*—
Cantatore, Giuseppe; Borzatta, Valerio; and Masina, Franca, 4,883,870, Cl. 540-598.000.

Boschert Incorporated: *See*—
Small, Kenneth T., 4,884,186, Cl. 363-132.000.

Bosna, Alexander A.: *See*—
Riccio, Louis M.; and Bosna, Alexander A., 4,883,703, Cl. 428-142.000.

Bossler, Hans J.; Enders, Peter; Boxhammer, Jorg; Rudolph, Bernd; and Sebralla, Bruno, to W.C. Heraeus GmbH. Auto-adjustable operating room light. 4,884,008, Cl. 315-152.000.

Bothe, Lothar; Crass, Guenther; Janocha, Siegfried; and Schloegl, Gunter, to Hoechst Aktiengesellschaft. Multilayer film containing a biaxially oriented polypropylene film. 4,883,698, Cl. 428-35.900.

Bott, John A. Vehicle deck rack with pop-up tie-downs. 4,883,208, Cl. 224-316.000.

Bougger, Gary E., to Dale Electronics, Inc. Surface mount wirewound resistor and method of making the same. 4,884,053, Cl. 338-275.000.

Bouldin, Eric W.; and Drexler, Jerome, to Drexler Technology Corporation. Data recording system for optical memory tape. 4,884,260, Cl. 369-93.000.

Bovenkerk, Harold P.: *See*—
Deakins, Martin E.; Slutz, David E.; Johnson, Neil R.; Clark, Thomas J.; and Bovenkerk, Harold P., 4,883,500, Cl. 51-298.000.

Bowen, Stephen A.: *See*—
August, Melvin C.; Neumann, Eugene F.; Bowen, Stephen A.; and Williams, John T., 4,884,168, Cl. 361-382.000.

Boxhammer, Jorg: *See*—
Bossler, Hans J.; Enders, Peter; Boxhammer, Jorg; Rudolph, Bernd; and Sebralla, Bruno, 4,884,008, Cl. 315-152.000.

Boyd, Brett H.: *See*—
Wilson, William N.; Miles, Leon H.; Boyd, Brett H.; and Carpenter, Robert B., 4,883,125, Cl. 166-291.000.

Boyer, Francis, to Societe Francaise d'Equipements pour la Navigation Aerienne S.F.E.N.A. Gyroscopic artificial horizon. 4,882,845, Cl. 33-328.000.

Boyle, Michael D. P.; and Yarnall, Michele, to University of Florida Research Foundation. Bacterial FC receptors. 4,883,754, Cl. 435-177.000.

BP Chemicals Limited: *See*—
Cloetens, Rudolpha C.; Lidy, Werner A.; and Thanh, Huy P., 4,883,832, Cl. 524-265.000.

Bracken, Brendan. Security fencing. 4,883,257, Cl. 256-54.000.

Braddock IV, Walter D.: *See*—
Au Coin, Thomas R.; Braddock IV, Walter D.; and Iafrate, Gerald J., 4,883,769, Cl. 437-110.000.

Bradley, Dennis, to Arrowin Limited. Vehicle sunroof. 4,883,313, Cl. 296-216.000.

Brady, Thomas E.: *See*—
Alvarado, Sergio I.; Crews, Alvin D., Jr.; Wepplo, Peter J.; Doehner, Robert F., Jr.; Brady, Thomas E.; Gange, David M.; and Little, Desiree L., 4,883,914, Cl. 564-91.000.

Braeutigam, Hans-Juergen: *See*—
Sekoulov, Ivan; and Braeutigam, Hans-Juergen, 4,883,594, Cl. 210-603.000.

Braginetz, Paul A.; Leadbetter, Mark R.; and Peduto, Joseph A. Disposable shielded medical syringe. 4,883,471, Cl. 604-195.000.

Brand, Mordechai: *See*—
Peled, Emanuel; Brand, Mordechai; Elster, Esther; Kimel, Josef; and Cohen, Ronen, 4,883,726, Cl. 424-120.000.

Brandeis University: *See*—
Perlman, Daniel, 4,883,597, Cl. 210-640.000.
Perlman, Daniel, 4,883,644, Cl. 422-104.000.

Bran+Luebbe GmbH: *See*—
Kemeny, Gabor J.; and Wetzel, David L., 4,883,963, Cl. 250-339.000.

Braun, Eugene R., to Eaton Corporation. Auxiliary transmission input section. 4,882,951, Cl. 74-745.000.

Brazdil, James F., Jr.; Glaeser, Linda C.; and Toft, Mark A., to Standard Oil Company, The. Ammoxidation of paraffins and catalysts therefor. 4,883,895, Cl. 558-319.000.

Brazdil, James F., Jr.: *See*—
Glaeser, Linda C.; Brazdil, James F., Jr.; and Toft, Mark A., 4,883,896, Cl. 558-319.000.

Brazier, Irvin L.: *See*—
Dornbusch, Arthur H.; Schanzle, Roger E.; and Brazier, Irvin L., 4,883,697, Cl. 428-35.700.

Brebner, Keith I., to Wood Polymer Composite Processes Ltd. Method of surface impregnation of wood articles and wood articles made therewith. 4,883,719, Cl. 428-541.000.

Breeuwer, Rene , to Ahrin BV. Method and an apparatus for determining the velocity, direction and other magnitudes of a flow, in particular a gas flow. 4,882,931, Cl. 73-189.000.

Brennan, H. George. Nasal tampon and method for using. 4,883,465, Cl. 604-96.000.

Bresson, Clarence R.; and Louthan, Rector P., to Phillips Petroleum Company. Ore flotation and sulfenyl dithiocarbamates as agents for use therein. 4,883,585, Cl. 209-166.000.

Brestel, John R.: *See*—
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Brewer, Tony M., to Data General Corporation. Method of addressing a computer memory. 4,884,244, Cl. 365-240.000.

Breyer, Karl-Hermann; Herzog, Klaus; and Szenger, Franz, to Carl-Zeiss-Stiftung, Heidenheim/Brenz. Probe head for a coordinate-measuring instrument. 4,882,848, Cl. 33-559.000.

Bridges, William B., to California Institute of Technology. Coupled waveguide laser array. 4,884,282, Cl. 372-97.000.

Brisson, Alfred G.: *See*—
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Bristol, Alexander C. Invisible flat-top mold blank and method for manufacturing same. 4,883,524, Cl. 65-37.000.

Bristol-Myers Company: *See*—
Kamei, Hideo; Ohbayashi, Masaru; Tomita, Koji; Sugawara, Koko; and Konishi, Masataka, 4,883,758, Cl. 435-253.500.

British Broadcasting Corporation: *See*—
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British Internal Combustion Engine Research Institute, Ltd.: *See*—
Mansfield, Wilfred P.; Mansfield, Jill; Mansfield, John R.; and Grice, Jeremy H., 4,883,026, Cl. 123-90.160.

British Petroleum Company p.l.c., The: *See*—
Bean, Malcolm; Grint, Alan; Proud, Graeme P.; and Rand, Brian, 4,883,617, Cl. 264-29.700.

Britton, Arthur, to Courtaulds PLC. Manufacture of flexible sheet material. 4,883,551, Cl. 156-178.000.

Broderick, Patricia A., to Research Foundation, The City University of New York. Cathodic electrochemical current arrangement with telemetric application. 4,883,057, Cl. 128-631.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Iwase, Takayuki; Sakanobe, Minoru; and Koga, Yuji, 4,883,376, Cl. 400-83.000.
Karube, Yoshiyuki; and Kawahara, Yuji, 4,883,375, Cl. 400-55.000.
Marii, Satoshi; Murata, Kunihiko; and Mitsui, Hiroyuki, 4,883,006, Cl. 112-121.120.
Matsumoto, Yumio, 4,884,098, Cl. 355-27.000.
Nagasaka, Nobusuke, 4,883,007, Cl. 112-226.000.
Sonoda, Takakuni; Tanabe, Kazunori; Iwase, Morikazu; Sangyoji, Kazuo; and Kato, Tokunori, 4,884,082, Cl. 346-105.000.

Brown, Jackson E.: *See*—
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Brown, James R.; McIntyre, Norman S.; and Johnston, Darlene D., to Energy, Mines and Resources-Canada. Cobalt-molybdenum thin film catalyst. 4,883,782, Cl. 502-220.000.

Brown, Len T. Golf aid. 4,883,276, Cl. 273-183.00B.

Brown, Peter E., to Moore Business Forms, Inc. Continuous partially preprinted web for heat sealed envelope construction. 4,883,220, Cl. 229-69.000.

Brown, Robert L., to Total Environmental Services Technology, Inc. Apparatus and process for measuring changes in effect of tidal forces. 4,882,929, Cl. 73-49.200.

Brown, William G., II. Solar power generation. 4,882,907, Cl. 60-649.000.

Brown & Williamson Tobacco Corporation: *See*—
Heaney, Richard; and Naslund, Erik I., 4,883,449, Cl. 493-43.000.

Browne, Antony N., to Nomad Structures International, Ltd. Building structures. 4,882,884, Cl. 52-82.000.

Browning, Robert L., to Formex Manufacturing, Inc. Transformer mounting pad having a cable opening lined with a safety barrier. 4,883,918, Cl. 174-1.000.

Bruecken, Thomas: *See*—
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Bruggeman, Jon; and Simonette, Dallas W., to Power Flo Products Corp. Bellows pneumatic system. 4,882,978, Cl. 92-34.000.

Bruncke, William C.: *See*—
Gossen, Richard N., Jr.; Bruncke, William C.; and Baker, Gordon D., 4,883,543, Cl. 437-37.000.

Brundage, David J., to Stone Container Corporation. Carton tray apparatus. 4,883,221, Cl. 229-143.000.

Bruning, John H., to American Telephone and Telegraph Company. Deep-uv lithography. 4,883,352, Cl. 353-122.000.

Brunner, Hubert: *See*—
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Brunswick Corporation: *See*—
Morgan, Edward J.; and Corbett, William D., 4,883,110, Cl. 164-249.000.

Brustle, Klaus: *See*—
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BSA Guns (UK) Limited: *See*—
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Buchanan, George: *See*—
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Buchholtz, Gerhard: *See*—
Franetzki, Manfred; Geisselbrecht, Georg; Buchholtz, Gerhard; Fickweller, Werner; and Obermann, Peter, 4,883,467, Cl. 604-152.000.

Buckley, Milford L.; and Burke, Harry L., to Corning Incorporated. Glass-ceramic support for fusing and sagging ophthmalmic multifocal lenses. 4,883,525, Cl. 65-37.000.

Budin, Maurice; and Veyrand, Pierre, to Automatismes Energie Electronique Systemes. Voltage regulator with ferromagnetic filter. 4,884,187, Cl. 363-141.000.

Buekers, Josef: *See*—
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Buhl, Reinhard, to Lemforder Metallwaren AG. Molecular joint for axle struts and connecting rods and similar parts of motor vehicles. 4,883,263, Cl. 267-293.000.

Bumgardner, Timothy G.: *See*—
Argyropoulos, John N.; Derderian, Edmond J.; Keen, Brian T.; and Bumgardner, Timothy G., 4,883,906, Cl. 560-238.000.

Bur, Marc: *See*—
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Burbank, John J., Jr.: *See*—
Primavera, Stephen W.; Burbank, John J., Jr.; and Neault, Garrett J., 4,883,588, Cl. 210-117.000.

Burczynski, Thomas J. Method of fabrication of a bullet having sections separable upon impact. 4,882,822, Cl. 29-1.220.

Burdick, Charles L., to Aqualon Company. Suspension of water-soluble polymers in aqueous media containing dissolved salts. 4,883,536, Cl. 106-194.000.

Burdick, Charles L., to Aqualon Company. Aqueous suspension of carboxymethylcellulose. 4,883,537, Cl. 106-194.000.

Burgdorf, Jochen; and Weize, Lutz, to Alfred Teves GmbH. Brake system with anti-locking and/or traction slip control. 4,883,328, Cl. 303-116.000.

Burk, Emmett H., Jr.; Yoo, Jin S.; and Radlowski, Cecelia A., to UOP. Composition of matter for conversion of hydrocarbons. 4,883,783, Cl. 502-304.000.

Burke, Edward J.: *See*—
Marlow, Raymond; Robertson, William M.; and Burke, Edward J., 4,883,538, Cl. 106-287.130.

Burke, Harry L.: *See*—
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Burley, John S., to Burley's Rink Supply. Dasher board system. 4,883,267, Cl. 272-3.000.

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Moncada, Salvador, 4,883,812, Cl. 514-469.000.

Burysek, Frantisek; Jirka, Bohuslav; Jarolimek, Zdenek; and Fajt, Ludvik, to Vyzkumny ustav bavlnarsky. Cop tube transporting device for textile machines. 4,883,231, Cl. 242-35.50A.

Busch, Bradley L.: *See*—
Lane, William E., Jr.; Leist, Clayton E., II; and Busch, Bradley L., 4,882,928, Cl. 73-19.000.

Busch, Donald E.: *See*—
Claar, Terry D.; Busch, Donald E.; and Picciolo, John J., 4,883,497, Cl. 29-623.500.

Bussjager, Rudy: *See*—
LaCount, Nelon N., II; Vyavaharkar, Dilip Y.; and Bussjager, Rudy, 4,882,913, Cl. 62-409.000.

Butera, Antonio: *See*—
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Butler Manufacuting Company: *See*—
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Butt, Sheldon H.: *See*—
SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., 4,883,778, Cl. 501-19.000.

Buysch, Hans-Josef; Schon, Norbert; Kress, Hans-Jurgen; Eichenauer, Herbert; and Buekers, Josef, to Bayer Aktiengesellschaft. Flame resistant antistatic polycarbonate moulding compounds. 4,883,835, Cl. 524-504.000.

Byer, Andrew. Doll. 4,883,441, Cl. 446-99.000.

Byrne, Brian, to International Flavors & Fragrances Inc. Process for preparing dry acetaldehyde and product produced thereby. 4,883,680, Cl. 426-534.000.

Byrnes, Raymond A., Jr. Speed control assembly for nutating cone transmission. 4,882,948, Cl. 74-690.000.

C & R Pier Manufacturing: *See*—
Giles, Charles E.; and Clifton, Richard J., 4,882,887, Cl. 52-126.600.

C.S.U. Ltd.: *See*—
Nakanishi, Tsutomu, 4,883,370, Cl. 384-490.000.

Caffaro s.p.a. Societa per l'Industria Chimica Ed Elettro Chimica: *See*—
Pontoglio, Enrico; Parodi, Sandro; and Caretti, Giancarlo, 4,883,893, Cl. 558-308.000.

Caffaro s.p.a. Societa per l'Industria Chimica ed Elettrochimica: *See*—
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Calderon, Reynaldo. Retrograde perfusion. 4,883,459, Cl. 604-28.000.

Caldwell, Melvin A.: *See*—
Stockl, Rebecca R.; Barton, Kenneth R.; and Caldwell, Melvin A., 4,883,714, Cl. 428-412.000.

California Institute of Technology: *See*—
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Grubbs, Robert H.; and Novak, Bruce M., 4,883,851, Cl. 526-268.000.
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Heyser, Richard C.; and Rooney, James A., 4,884,246, Cl. 367-7.000.
Johnston, Alan R.; Nixon, Robert H.; Bergman, Larry A.; and Esener, Sadik, 4,884,243, Cl. 365-234.000.

Calspan Corporation: *See*—
Schneeberger, Richard F.; and Akers, Charles K., 4,884,076, Cl. 342-5.000.

Calvert, Michael A., to Prime Actuator Control Systems Limited. Device containing a force-imparting means and equipped with safety means. 4,883,262, Cl. 267-175.000.

Camann, James C.: *See*—
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Campbell, Adrian D.; and Rank, William E., to General Motor Corporation. Slider for window regulator arm. 4,882,805, Cl. 16-93.00R.

Campbell, Paul G.: *See*—
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Campbell, Roy; Price, Anthony G.; and Green, Andrew P., to Lucas Industries public limited company. Vehicle disc brakes of the liquid cooled type. 4,883,149, Cl. 188-264.00E.

Canadian Patents and Development Limited: *See*—
Dealy, John M.; Charrier, Jean-Michael; and Doshi, Shailesh, 4,883,622, Cl. 264-108.000.

Canadian Patents and Development Limited-Societe Canadienne Des Brevets Et D'Exploitation Limitee: *See*—
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Canon Kabushiki Kaisha: *See*—
Aoki, Kanemasa, 4,883,996, Cl. 310-154.000.
Arimoto, Shinobu; and Muramatsu, Masanori, 4,884,147, Cl. 358-443.000.
Fukuda, Tsuguhiro; Sato, Hiroshi; and Nakajima, Kazuhiro, 4,883,379, Cl. 400-697.100.
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Iida, Noriyoshi; Uto, Nobutaka; Hiroi, Masakazu; and Hoshi, Akimitsu, 4,883,265, Cl. 271-220.000.
Ina, Hideki; and Suzuki, Akiyoshi, 4,883,359, Cl. 356-401.000.
Inoue, Hiroshi; Omata, Satoshi; Osada, Yoshiyuki; Inoue, Yutaka; Yamakawa, Tadashi; and Satomura, Hiroshi, 4,884,079, Cl. 346-1.100.
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Kuge, Tsukasa; Goto, Masahiro; and Sakane, Isamu, 4,883,715, Cl. 428-421.000.
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Miyakawa, Hideaki; and Kameyama, Makoto, 4,884,156, Cl. 360-121.000.
Okada, Shinjiro; Yoshinaga, Kazuo; Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Hanyu, Yukio; Yamashita, Masataka; and Katagiri, Kazuharu, 4,883,344, Cl. 350-339.00R.
Ozawa, Masakazu; Ozawa, Kunitaka; Hatanaka, Katsunori; Suzuki, Tetsuo; Mori, Tetsuzo; Shiina, Tadashi; and Ebinuna, Ryuichi, 4,884,085, Cl. 346-136.000.
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Canon Seiki Kabushiki Kaisha: *See*—
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Cantatore, Giuseppe; Borzatta, Valerio; and Masina, Franca, to Ciba-Geigy Corporation. Piperidine-triazine compounds for use as stabilizers for organic materials. 4,883,870, Cl. 540-598.000.
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Caprasse, Friedhelm, to Siemens Aktiengesellschaft. Method and apparatus for monitoring the consistency of successive binary code signal groups in data processing equipment. 4,884,273, Cl. 371-49.400.
Carabasi, R. Anthony; Jarrell, Bruce E.; and Williams, Stuart K., to Thomas Jefferson University. Method of reendothelializing vascular linings. 4,883,755, Cl. 435-240.200.
Cardinal Tank Corp.: *See*—
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Caretti, Giancarlo: *See*—
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Pontoglio, Enrico; Parodi, Sandro; and Caretti, Giancarlo, 4,883,894, Cl. 558-311.000.
Carl-Zeiss-Stiftung, Heidenheim/Brenz: *See*—
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Carlton, Wayne. Animal call device holder and assembly. 4,883,171, Cl. 206-315.110.
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Carpenter, Larry L.; Morrell, Mark L.; and Schrauth, Peter A., to Corning Incorporated. Apparatus for molding glass optical elements. 4,883,528, Cl. 65-275.000.
Carpenter, Michael K.: *See*—
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Carpenter, Robert B.: *See*—
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Carstensen, Kenneth J. Method for improving the integrity of coupling sections in high performance tubing and casing. 4,882,830, Cl. 29-421.100.
Cartasegna, Silvestro, to Exxon Chemical Patents Inc. Elastomer modified polycarbonate compositions of improved impact strength. 4,883,840, Cl. 525-146.000.
Carter, Neil A., to Owens-Corning Fiberglas Corporation. Method and apparatus for coating elongate members. 4,883,690, Cl. 427-430.100.
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Cassidy, Jerald L. Combination running light and spot light device for a boat. 4,884,173, Cl. 362-61.000.
Castonguay, Roger N.; Palmieri, Joseph M.; and Scott, Graham A., to General Electric Company. Molded case circuit breaker current transformer assembly. 4,884,048, Cl. 335-18.000.
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Lonn, Alan H.; and Nelson, Daniel W., 4,883,129, Cl. 172-777.000.
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Chase, Herbert S. Folding play structure. 4,883,443, Cl. 446-478.000.
Chatterson, Louis M.; and Cutean, Bruce, to Haworth, Inc. Panel port retention system. 4,882,885, Cl. 52-221.000.
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Chemical Fabrics Corporation: *See*—
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Chen, Patrick P.; Chiu, Taiwoo; and Skerrett, J. Richard, to Scott Paper Company. Creping device adhesive formulation. 4,883,564, Cl. 162-112.000.
Chen, Sheng-Chuan: *See*—
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Chen, Shirley C.: *See*—
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Chern, Terry S.; De La Veaux, Stephan C.; Lahijani, Jacob; and Van Trump, James E., to Du Pont de Nemours, E. I., and Company. Process for manufacturing a high modulus poly-p-phenylene terephthalamide fiber. 4,883,634, Cl. 264-555.000.
Chervu, Lakshman R.; Bhargava, Kuldeep K.; and Blaufox, M. Donald, to Albert Einstein College of Medicine - of Yeshiva University. Mercaptosuccinyl glycyl-glycyl-glycine a complex thereof with Tc-99m, and methods of making the same. 4,883,862, Cl. 530-331.000.
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Chevion, Dan S.; Karnin, Ehud D.; and Walach, Eugeniusz, to International Business Machines Corp. Stereoscopic television system with predictive coding to minimize data bandwidth. 4,884,131, Cl. 358-88.000.
Chevrier, Claude. Sprayer marker. 4,883,127, Cl. 172-126.000.
Chiarulli, Donald M.; Melhem, Rami; and Levitan, Steven P., to University of Pittsburgh, The. Optical selector switch. 4,883,334, Cl. 350-96.130.
Chiba, Jiro: *See*—
Kawakami, Keiichi; Takabatake, Mitsuo; and Chiba, Jiro, 4,883,705, Cl. 428-209.000.
Chiba, Kazuo; Ohishi, Yoshiaki; Migita, Jituo; Mochizuki, Hajime; and Kobayashi, Takao, to Furukawa Electric Co., Ltd., The. Composite magnetic and optical head. 4,883,950, Cl. 235-440.000.
Chida, Katsunori: *See*—
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Chien, Te-Yen: *See—*
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Chien, Yie W.; Lee, Chia-Shun; Valia, Kirti H.; and Chien, Te-Yen, to Rutgers, The State University of New Jersey. Transdermal absorption dosage unit for estradiol and other estrogenic steroids and process for administration. 4,883,669, Cl. 424-448.000.
Chikazawa, Bunichiro: *See—*
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Chiu, Edison H.; and Pang, Roland H., to Texas Instruments Incorporated. Easily cascadable and testable cache memory. 4,884,270, Cl. 371-21.200.
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Chow, Wing-Sun; Chen, Shirley C.; and Timmins, Peter. Complex of anti-fungal agent and cyclodextrin and method. 4,883,785, Cl. 514-31.000.
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Christensen, Kean. Releasable chain keeper. 4,883,191, Cl. 220-83.000.
Christensson, Lars, to Akerlund & Rausing Licens AB. Powder proof reclosable lid for containers. 4,883,193, Cl. 220-266.000.
Christian, Fredrick W. Towbar and come-along for light aircraft. 4,883,280, Cl. 280-3.000.
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Church, Russell W.; and Heltemes, Eugene C., to Minnesota Mining and Manufacturing Company. Dual status magnetic marker having magnetically biasable flux collectors for use in electronic article surveillance systems. 4,884,063, Cl. 340-572.000.
Ciallella, Loretta K., to Colgate-Palmolive Co. Soil release promoting liquid detergent composition containing a pet-poet copolymer and narrow range alcohol ethoxylate. 4,883,610, Cl. 252-559.000.
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Cleeves, James M.; and Heard, James G., to National Semiconductor Corporation. Process for making a self-aligned silicide shunt. 4,883,772, Cl. 437-200.000.
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Clinical Biotechnologies, Inc.: *See—*
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Cloetens, Rudolpha C.; Lidy, Werner A.; and Thanh, Huy P., to BP Chemicals Limited. Preparation of polymer polyols. 4,883,832, Cl. 524-265.000.
Clorox Company, The: *See—*
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Clough, John M.; Godfrey, Christopher R. A.; de Fraine, Paul J.; and Snell, Brian K., to Imperial Chemical Industries PLC. 1,2,5,6-tetrahydropyridyl triazoles and tetrazoles useful as fungicides. 4,883,807, Cl. 514-427.000.
Cobb, Alan J.: *See—*
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Coffey, Freylon B.: *See—*
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Cok, Steven P.; and Lewandowski, Robert J., to John Fluke Mfg. Co. Inc. Wide range digital phase/frequency detector. 4,884,035, Cl. 328-133.000.
Cole, Michael; Munden, Dennis L.; and Ryan, Marilynn J. Thread friction measurement arrangement. 4,883,531, Cl. 73-9.000.
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Commonwealth Scientific and Industrial Research Organization: *See—*
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Compax Corp.: *See—*
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Concha, Fernando; and Stancil, Charles J., to International Business Machines Corporation. Error checking and correcting for read-modified-write operations. 4,884,271, Cl. 371-40.200.
Confalonieri, Pierangelo; Pernici, Sergio; and Nicollini, Germano, to SGS-Thomson Microelectronics srl. Antibounce circuit for digital circuits. 4,883,993, Cl. 307-542.100.
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Conseil National de Recherches du Canada: *See—*
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Cristea, Eugen D., to T.T.C. Termo Tecnica Ceramica S.P.A. Mixed air and gas nozzle for gas burners, in particular burners of low thermal output for firing kilns. 4,883,422, Cl. 431-182.000.
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Daicel Chemical Industries, Ltd.: *See—*
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Davis, Thomas J. Counterbalancing torsion spring mechanism for devices which move up and down and method of setting the torsion springs thereof. 4,882,806, Cl. 16-198.000.
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Dawe, Peter H. Device for accurately positioning and aligning a guide sleeve into a bore of a cylinder head. 4,882,829, Cl. 29-251.000.

Dawson, John F.; Bednarski, Joseph W.; Stoffer, Marie A.; and Cousens, James A., to Honeywell Inc. Address generator with variable scan patterns. 4,884,220, Cl. 364-521.000.

Day, Charles E.; and Kuhrts, Eric H., to Hauser-Kuhrts, Inc. Method and composition for reducing serum cholesterol. 4,883,788, Cl. 514-57.000.

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Deakins, Martin E.; Slutz, David E.; Johnson, Neil R.; Clark, Thomas J.; and Bovenkerk, Harold P., to General Electric Company. Sawblade segments utilizing polycrystalline diamond grit. 4,883,500, Cl. 51-298.000.

Deal, Samuel B.; and Bartch, Donald W., to RCA Licensing Corp. Color cathode-ray tube having a heat dissipative, electron reflective coating on a color selection electrode. 4,884,004, Cl. 313-402.000.

Dealy, John M.; Charrier, Jean-Michael; and Doshi, Shailesh, to Canadian Patents and Development Limited. Method of manufacturing discrete fiber reinforced, plastic tube and apparatus therefor. 4,883,622, Cl. 264-108.000.

Deane, Peter, to Xicor, Inc. Low power dual-mode CMOS bias voltage generator. 4,883,976, Cl. 307-291.200.

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DeCaria, Frank O.: *See—*
Skeirik, Richard D.; and DeCaria, Frank O., 4,884,217, Cl. 364-513.000.

De Cesare, Dominic. Two pole electric motor constructions with stator winding encircling the rotor and method of assembling same. 4,883,997, Cl. 310-179.000.

Dechow, Frederick L., to Dec in Tech, Inc. Blood sampling device and method. 4,883,068, Cl. 128-760.000.

Decoufle s.a.r.l.: *See—*
Irigoyen, Pierre, 4,883,077, Cl. 131-108.000.

Deep, Marguerite E.; and Thein, Nelson H., to Raychem Corporation. Conductive polymer devices. 4,884,163, Cl. 361-58.000.

Deere & Company: *See—*
Wanie, Lee J.; Behrens, Robert N.; DeBraal, Stanley J.; and Bedis, Michael, 4,883,137, Cl. 180-6.340.

de Fraine, Paul J.: *See—*
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Degussa Aktiengesellschaft: *See—*
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Dekker, David L., to Mount Isa Mines Limited. Method and apparatus for removing noise. 4,884,229, Cl. 364-724.110.

Del Mar Avionics: *See—*
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Delaney, Dennis D.: *See—*
Koepke, Jeffery W.; and Delaney, Dennis D., 4,883,601, Cl. 210-710.000.

Delco Electronics Corporation: *See—*
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Delgado, Jorge H.: *See—*
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Dell'Oca, Conrad J.: *See—*
Hui, Alex C.; Wong, Anthony Y.; Dell'Oca, Conrad J.; Wong, Daniel; and Szeto, Roger, 4,884,118, Cl. 357-45.000.

Delta Elettronica S.p.A.: *See—*
Memmola, Serafino, 4,884,055, Cl. 340-426.000.

Deltatto, Charles D. Ergonomic aerial basket. 4,883,145, Cl. 182-2.000.

deMey, Charles F., II, to Perkin-Elmer Corporation, The. Spectrometer detector mounting assembly. 4,883,356, Cl. 356-326.000.

Denda, Toshio, to Teraoka Seiko Co., Limited. Film folding control apparatus of wrapping system. 4,884,209, Cl. 364-468.000.

Dennison, Stanley M.; and Prater, Cordell E., to Texas Instruments Incorporated. Static row driver. 4,884,240, Cl. 365-189.090.

Dento-Med Industries, Inc.: *See—*
Goodman, Jack J.; Tauman, Harvey S.; Fox, Charles; and Hart, Thomas J., 4,883,659, Cl. 424-78.000.

Derderian, Edmond J.: *See—*
Argyropoulos, John N.; Derderian, Edmond J.; Keen, Brian T.; and Bumgardner, Timothy G., 4,883,906, Cl. 560-238.000.

Derek George Davison: *See—*
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De Rosa, Mario: *See—*
Zappia, Vincenzo; and De Rosa, Mario, 4,883,670, Cl. 424-450.000.

Destree, Xavier P.; and Lazzari, Angelo A., to Eurosteel s.a. Moldable material reinforcement fibers with hydraulic or non-hydraulic binder and manufacturing thereof. 4,883,713, Cl. 428-397.000.

Deur, Ted E.: *See—*
Anderson, Jeffrey J.; Moore, John S.; Deur, Ted E.; and Roy, Joy, 4,883,219, Cl. 228-190.000.

Dewees, Thomas G.: *See—*
Mizusawa, Eugene A.; Paone, Donald J.; Casella, Tracey L.; Flores, Dorothy L.; Choy, Clement K.; Gerritsen, Jan; Heiskell, Ronald E.; Dewees, Thomas G.; and Ellgen, Jon L., 4,882,917, Cl. 68-17.00A.

Diaz, Antonio G., to Sociedad Anomina De Racionalcion Y Mecanizacion (Sadrym). Pitting piercer for fruit pitting machines. 4,882,986, Cl. 99-494.000.

Dickakian, Ghazi B., to Exxon Chemical Patents Inc. Pretreatment for reducing oxidative reactivity of baseoils. 4,883,581, Cl. 208-48.00R.

Didier-Werke AG: *See—*
Kainer, Hartmut; Grimm, Daniel; Schnelle, Wilfried; and Halbach, Peter, 4,883,647, Cl. 423-239.000.

Dieck, Ronald L.: *See—*
Aniuk, Lawrence M.; Dieck, Ronald L.; and Hardy, Dwayne, 4,883,699, Cl. 428-36.900.

Diederich, Walter J.; and Nelson, Robert E., to TPV Energy Systems, Inc. Refractory metal oxide processes. 4,883,619, Cl. 264-60.000.

Diehl GmbH & Co.: *See—*
Bock, Erich; and Himmert, Rainer, 4,882,996, Cl. 102-496.000.
Lachmann, Karl-Heinz; Sundermeyer, Peter; Schreier, Johann; Reindler, Albrecht; and Leininger, Jurgen, 4,883,239, Cl. 244-3.150.

Diehl, Manfred, to Degussa Aktiengesellschaft. Water-insoluble silicate containing detergent builder granulate. 4,883,607, Cl. 252-174.180.

Diehm, Brian D.: *See—*
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Diesel Kiki Co., Ltd.: *See—*
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Digital Equipment Corporation: *See—*
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Dimitrijevic, Peter: *See—*
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Ding, Gustav L. P.: *See—*
Nagy, Gabor S.; Akeson, Richard C.; Sweenie, Richard E.; Novak, Mark E.; Malsch, Harry K.; Widule, Thomas J.; Ding, Gustav L. P.; and Jackson, Jared K., 4,882,930, Cl. 73-56.000.

Dionne, Gerald L.: *See—*
Hipple, James E.; Dionne, Gerald L.; Torii, Yasuhiro; Shimada, Masaru; and Watanabe, Iwao, 4,883,968, Cl. 250-423.00R.

Dionne, Pierre: *See—*
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Dionne, Pierre A., to Dionne, Pierre; and Southeast Foam Converting & Packaging, Inc., a part interest. Angled packing material. 4,883,179, Cl. 206-523.000.

DiPerna, Paul M., to Teradyne, Inc. Test pin assembly for circuit board tester. 4,884,024, Cl. 324-158.00F.

Disdier, Camille: *See—*
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Disetronic Ag.: *See—*
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Diving Unlimited International, Inc.: *See—*
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Dixit, Pankaj; Sliwa, Jack; Klein, Richard K.; Sander, Craig S.; and Farnaam, Mohammad, to Advanced Micro Devices, Inc. Contact plug and interconnect employing a barrier lining and a backfilled conductor material. 4,884,123, Cl. 357-71.000.

Dixon Automatic Tool, Inc.: *See—*
Dixon, Paul H., 4,883,130, Cl. 173-12.000.

Dixon, George J.; Anthon, Douglas W.; and Clark, John H., to Amoco Corporation. Optical feedback control in the frequency conversion of laser diode radiation. 4,884,276, Cl. 372-21.000.

Dixon, John: *See—*
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Dixon, Paul H., to Dixon Automatic Tool, Inc. Dual speed transmission for automatic assembly machine. 4,883,130, Cl. 173-12.000.

Djennas, Frank; and Mitchell, Curtis W., to Motorola, Inc. Silver flashing process on semiconductor leadframes. 4,883,774, Cl. 437-211.000.

Dobbs, Bradley A.; Wigmore, David B.; and Niggemann, Richard E., to Sundstrand Corporation. Swirl flow heat exchanger with reverse spiral configuration. 4,883,117, Cl. 165-164.000.

Dobie, Michael J.: *See—*
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Dr. Ing. h.c.F. Porsche AG: *See—*
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Dr. Ing. h.c.V. Porsch AG: *See*—
Gausrab, Klaus; Hauser, Joachim; and Mueller, Robert, 4,882,950, Cl. 74-714.000.

Doehler, Joachim; Hudgens, Stephen J.; Ovshinsky, Stanford R.; Dotter II, Buddie; Peedin, Lester R.; Krisko, Jeffrey M.; and Krisko, Annette, to Energy Conversion Devices, Inc. Method for the high rate plasma deposition of high quality material. 4,883,686, Cl. 427-38.000.

Doehner, Robert F., Jr.: *See*—
Alvarado, Sergio I.; Crews, Alvin D., Jr.; Wepplo, Peter J.; Doehner, Robert F., Jr.; Brady, Thomas E.; Gange, David M.; and Little, Desiree L., 4,883,914, Cl. 564-91.000.

Dohgome, Hirofumi: *See*—
Enomoto, Hiromu; Dohgome, Hirofumi; Kumagai, Masao; Nakamura, Toru; and Yoshiyama, Kimitaka, 4,883,975, Cl. 307-290.000.

Dohi, Katsuji; Kumada, Akira; and Murata, Michihiro, to Murata Mfg. Co., Ltd. Temperature sensor. 4,883,366, Cl. 374-184.000.

Dohler, Gottfried H.; Hasnain, Ghulam; and Miller, Jeffrey N., to Hewlett-Packard Company. Selective NIPI doping super lattice contacts and other semiconductor device structures formed by shadow masking fabrication. 4,883,770, Cl. 437-110.000.

Doi, Hiroshi: *See*—
Masuoka, Shigeru; and Doi, Hiroshi, 4,883,852, Cl. 526-279.000.

Dolphin, David: *See*—
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Dominguez, Richard L., to Solar Lighting Research, Inc. Solar lighting reflector apparatus having slatted mirrors and improved tracker. 4,883,340, Cl. 350-260.000.

Dominique, Boulot, to Clecim S. A. Rolling mill roll with rotating shell. 4,882,922, Cl. 72-243.000.

Donaghue, Christopher: *See*—
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Donaldson Company, Inc.: *See*—
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Monson, Donald R.; and Leblanc, James A., 4,883,513, Cl. 55-385.200.

Dorleans, Guy, to Valeo Vision. Attachment and hinging component, especially for a device to adjust an optical element, particularly for a motor vehicle headlight. 4,884,174, Cl. 362-61.000.

Dornbusch, Arthur H.; Schanzle, Roger E.; and Brazier, Irvin L., to Procter & Gamble Company, The. Thermoplastic in-mold labeling label structure for deformable thermoplastic packages. 4,883,697, Cl. 428-35.700.

dos Santos Pereina Ribeiro, Carlos A. S. P., to hartec Gesellschaft fur Hartstoffe und Dunnschichttechnik mbH & Co. KG. Method for applying coatings to objects by means of magnetic field supported reactive cathode sputtering. 4,883,574, Cl. 204-192.150.

Dosapro Milton Roy: *See*—
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Doshi, Shailesh: *See*—
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Dotter II, Buddie: *See*—
Doehler, Joachim; Hudgens, Stephen J.; Ovshinsky, Stanford R.; Dotter II, Buddie; Peedin, Lester R.; Krisko, Jeffrey M.; and Krisko, Annette, 4,883,686, Cl. 427-38.000.

Dow Chemical Company, The: *See*—
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Moore, Eugene R.; Dalke, Brian D.; Malanga, Michael T.; and Poindexter, Gary M., 4,883,846, Cl. 526-73.000.
Pyzik, Aleksander J.; Dubensky, William J.; Schwarz, Douglas B.; and Beaman, Donald R., 4,883,776, Cl. 501-10.000.
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Draghetti, Fiorenzo: *See*—
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Drewes, Douglas A.; and Yee, Phillip D., to Federal-Mogul Corporation. Self-aligning bearing carrier. 4,883,154, Cl. 192-98.000.

Drexler, Jerome: *See*—
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Drexler Technology Corporation: *See*—
Bouldin, Eric W.; and Drexler, Jerome, 4,884,260, Cl. 369-93.000.

Dreyfus, Roger, to I.C.P., S.A. Reinforcing corner flap for group packages. 4,883,168, Cl. 206-152.000.

Drigani, Fausto; and Poloni, Alfredo, to Danieli & C. Officine Meccaniche SpA. Device to clamp a roll assembly having a vertical axis on universal rolling stands. 4,883,372, Cl. 384-585.000.

Drug Delivery Systems Inc.: *See*—
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Dryvit System, Inc.: *See*—
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Dubensky, William J.: *See*—
Pyzik, Aleksander J.; Dubensky, William J.; Schwarz, Douglas B.; and Beaman, Donald R., 4,883,776, Cl. 501-10.000.

Dubost, Dominique, to RAPID S.A. U-shaped fastening clip device with resilient tongue member. 4,883,397, Cl. 411-174.000.

Ducellier & Cie: *See*—
Meuret, Jean-Pierre; Ducrot, Christian; and Vogelsberger, Marcel, 4,884,018, Cl. 322-8.000.

Ducharme, Cyril L.; Eickhof, Ralph C.; Heider, David A.; Neiberger, Denny W.; and Maass, Fred, to Personal Pet Products Partnership. Absorbent composition. 4,883,021, Cl. 119-1.000.

Ducrot, Christian: *See*—
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Dufour, Marcel, to Asten Group, Inc. Papermakers wet felts. 4,883,097, Cl. 139-383.00A.

Dujardin Montbard Somenor: *See*—
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Duke University: *See*—
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Dunbar, Frank C.: *See*—
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Duncan, Edward H., to Sullivan, Daniel A., Jr., a part interest. Toggle bolt installation, hardware, and manufacture. 4,883,398, Cl. 411-344.000.

Duncanson, Jay P.; and Speckenbach, Stephen J., to Hayes Microcomputer Products, Inc. Method and apparatus for connecting ISDN devices over an analog telephone line. 4,884,269, Cl. 370-110.100.

Dunn, Edmund M.; Kang, Shinhoo; and Wei, George C., to GTE Laboratories Incorporated. Method of bonding a ceramic article to a metal article. 4,883,217, Cl. 228-122.000.

Dunn, Edmund M.; Kang, Shinhoo; and Wei, George C., to GTE Laboratories Incorporated. Method of brazing a ceramic article to a metal article. 4,883,218, Cl. 228-122.000.

Dunn, Murray R.: *See*—
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Dunn, Robert A.: *See*—
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Du Pont de Nemours, E. I., and Company: *See*—
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Fitzgerald, Patrick H.; Rao, Nandakumar S.; Vinod, Yashavant; V.; and Alender, Jeffrey R., 4,883,839, Cl. 525-136.000.
Ghorashi, Hamid M., 4,883,496, Cl. 8-476.000.
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Seidel, William C., 4,883,910, Cl. 562-528.000.
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Durkopp Systemtechnik GmbH: *See*—
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Durkoppwerke GmbH: *See*—
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Duyckinck, Robert W.: *See*—
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Giusti, Giambattista; and Duyckinck, Robert W., 4,883,510, Cl. 55-326.000.

Dziekan, Lee M.: *See*—
Van Hout, James E.; and Dziekan, Lee M., 4,883,932, Cl. 200-339.000.

Dziura, Richard A.; Russell, Ronald R.; and Scott, Graham A., to General Electric Company. Molded case electronic circuit interrupter. 4,884,164, Cl. 361-97.000.

Dziura, Walter H.; Fusco, Angelo; and Khosravi, Parviz, to Scovill Fasteners Inc. Apparatus for installing sliders on a gapped slide fastener chain. 4,882,824, Cl. 29-33.200.

E. R. Squibb & Sons, Inc.: *See*—
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Earls, Jimmy D.: *See*—
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Eastern Oil Tools PTE Ltd.: *See*—
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Eastman Christensen: *See*—
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Eastman Christensen Co.: *See*—
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Eastman Kodak Company: *See*—
Giannetti, John; Couture, Robert L.; and Sleve, Jerry F., 4,884,097, Cl. 355-23.000.
Harris, Calvin E., 4,884,106, Cl. 355-212.000.
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Joseph, Brian J.; Procter, Leo G.; and Roy, Carl W., 4,884,105, Cl. 355-212.000.
Niedospial, John J., Jr., 4,883,235, Cl. 242-71.100.
Niedospial, John J., Jr.; and Fairman, Patricia D., 4,883,236, Cl. 242-71.100.

Stockl, Rebecca R.; Barton, Kenneth R.; and Caldwell, Melvin A., 4,883,714, Cl. 428-412.000.
Townsend, Ensley E., 4,884,099, Cl. 355-55.000.
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Eaton Corporation: *See—*
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Hipple, James E.; Dionne, Gerald L.; Torii, Yasuhiro; Shimada, Masaru; and Watanabe, Iwao, 4,883,968, Cl. 250-423.00R.
Schultz, Gary R., 4,883,105, Cl. 152-416.000.
Schultz, Gary R.; and Kwasniewski, Dale L., 4,883,106, Cl. 152-417.000.

Ebinuna, Ryuichi: *See—*
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Eckenhoff, James B., to ALZA Corporation. Process for forming dispensing device. 4,883,667, Cl. 424-438.000.

Ecolab Inc.: *See—*
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Ecoplastics Limited: *See—*
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Eda, Yasuyuki; Maeda, Toshihiro; Nishiyama, Kiyoto; and Tashiro, Akira, to Juridical Foundation the Chemo-Sero-Therapeutic Research Institute. Method for preparing monoclonal antibody to Hbsag. 4,883,752, Cl. 435-68.000.

Edwards, Scott R.: *See—*
Shepherd, Michael T.; and Edwards, Scott R., 4,883,484, Cl. 604-891.100.

Effenberger, John A.; Koerber, Keith G.; Latorra, Michael N.; and Petriello, John V., to Chemical Fabrics Corporation. Method for manufacture of cast fluoropolymer-containing films at high productivity. 4,883,716, Cl. 428-421.000.

Effland, Richard C.: *See—*
Hamer, R. Russell L.; Effland, Richard C.; and Klein, Joseph T., 4,883,794, Cl. 514-248.000.

Efthimion, Philip C.; and Helfritch, Dennis J., to Research-Cottrell, Inc. Apparatus and method for enhanced chemical processing in high pressure and atmospheric plasmas produced by high frequency electromagnetic waves. 4,883,570, Cl. 204-164.000.

Egawa, Hideharu; and Suzuki, Yasoji, to Tokyo Shibaura Denki Kabushiki Kaisha. High density semiconductor circuit using CMOS transistors. 4,883,986, Cl. 307-298.000.

Eggendorfer, Gunnar: *See—*
Skolaude, Werner; Eggendorfer, Gunnar; and Corduan, Horst, 4,883,518, Cl. 62-38.000.

Eggleston, Richard A.: *See—*
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EGIS Gyogyszergyar: *See—*
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Ehmig, Gerhard: *See—*
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Eichelberger, Charles W.; Wojnarowski, Robert J.; and Welles, Kenneth B., II, to General Electric Company. Method and configuration for testing electronic circuits and integrated circuit chips using a removable overlay layer. 4,884,122, Cl. 357-71.000.

Eichenauer, Herbert: *See—*
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Eisai Co., Ltd.: *See—*
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Eitoku, Kenji; Tateishi, Mamoru; and Hayashi, Kenji, to Aisan Kogyo Kabushiki. Contact structure for slider position sensor. 4,884,052, Cl. 338-202.000.

Eldridge, Paul M.: *See—*
Perry, John H., Jr.; Bhatt, Bharat K.; Capps, Jesse; Eldridge, Paul M.; Greiner, Leonard; Lockyer, Robert W.; Martin, Michelle; McNeice, Raymond R.; Misiaszek, Steven M.; Perry, Stanton S.; Sullivan, Thomas F.; and Campbell, Paul G., 4,883,823, Cl. 518-702.000.

Electric Power Research Institute, Inc.: *See—*
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Electricite De France (Service National): *See—*
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Electromagnetic Sciences, Inc.: *See—*
Alverson, William K.; and Ruller, James A., 4,884,045, Cl. 333-158.000.

Ellgen, Jon L.: *See—*
Mizusawa, Eugene A.; Paone, Donald J.; Casella, Tracey L.; Flores, Dorothy L.; Choy, Clement K.; Gerritsen, Jan; Heiskell, Ronald E.; Dewees, Thomas G.; and Ellgen, Jon L., 4,882,917, Cl. 68-17.00A.

Elliott, Charles T., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Thermal imaging devices. 4,883,962, Cl. 250-334.000.

Elliott, Everett E. Vehicular window sun shield. 4,883,304, Cl. 296-97.800.

Ellis, Guy T., Jr.: *See—*
Schroeder, Gene F.; and Ellis, Guy T., Jr., 4,884,265, Cl. 370-70.000.

Elongo, Varadaraj, to Hoechst Celanese Corporation. Synthesis of 2-(4-aminophenoxy)alkanoic acids and esters and their derivatives. 4,883,901, Cl. 560-45.000.

Elster, Esther: *See—*
Peled, Emanuel; Brand, Mordechai; Elster, Esther; Kimel, Josef; and Cohen, Ronen, 4,883,726, Cl. 424-120.000.

Emerson Electric Co.: *See—*
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Lewis, John G., 4,882,832, Cl. 29-596.000.
Terpstra, Daniel A.; and Plume, Steven H., 4,882,962, Cl. 83-812.000.

Emura, Noriaki: *See—*
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Enda, Kozue: *See—*
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Enders, Peter: *See—*
Bossler, Hans J.; Enders, Peter; Boxhammer, Jorg; Rudolph, Bernd; and Sebralla, Bruno, 4,884,008, Cl. 315-152.000.

Endo, Mikio; Takamizawa, Minoru; Ishihara, Toshinobu; Kubota, Tohru; and Shinohara, Toshio, to Shin-Etsu Chemical Co., Ltd. Method for the preparation of a cycloalkyl silane compound. 4,883,569, Cl. 204-157.740.

Endo, Norikazu, to Hitachi, Ltd. Multiprocessor system for loading microprograms into a RAM control store of a bus controller. 4,884,195, Cl. 364-200.000.

Energy Conversion Devices, Inc.: *See—*
Doehler, Joachim; Hudgens, Stephen J.; Ovshinsky, Stanford R.; Dotter II, Buddie; Peedin, Lester R.; Krisko, Jeffrey M.; and Krisko, Annette, 4,883,686, Cl. 427-38.000.

Energy, Mines and Resources-Canada: *See—*
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Enfo Grundlagenforschungs AG: *See—*
Blankenhagen, Fred; and Putz, Hermann, 4,883,638, Cl. 419-9.000.

Engle, Thomas H., to General Signal Corp. Stub axle truck. 4,883,000, Cl. 105-4.400.

Enichem Tecnoresine, S.p.A.: *See—*
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Enk, Allan T.; Wolfe, Jennifer R.; and Borer, John W., to Libbey-Owens-Ford Co. Method and apparatus for shaping and conveying glass sheets. 4,883,526, Cl. 65-104.000.

Enomoto, Hiromu; Dohgome, Hirofumi; Kumagai, Masao; Nakamura, Toru; and Yoshiyama, Kimitaka, to Fujitsu Limited; and Kyushu Fujitsu Electronics Limited. Schmitt trigger circuit. 4,883,975, Cl. 307-290.000.

EquiMed Corporation: *See—*
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Equipment Tracking Network, Inc.: *See—*
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Erickson, Thomas F., Jr. Transporation system and method of operation. 4,883,245, Cl. 246-2.00R.

Ernst, Uwe: *See—*
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Ernsting, Peter B., to Lever Brothers Company. Process for preparing an edible dispersion. 4,883,681, Cl. 426-573.000.

Esener, Sadik: *See—*
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Eskelinen, Pekka J.: *See—*
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Esposito, Joseph R. Three legged workbench. 4,883,246, Cl. 248-165.000.

Esser, Hildegard; and Grzesik, Ulrich. Method of measuring optical radiation energy reflected by a reflection area. 4,883,954, Cl. 250-227.000.

Essig, Robert A.: *See—*
Meehan, Kermit E.; Nichols, William T.; Meehan, Timothy S.; and Essig, Robert A., 4,882,910, Cl. 62-256.000.

ETA SA Fabriques d'Ebauches: *See—*
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Etat Francais Represente Par Le Ministre Des PTT (Centre National D'Etudes Des Telecommunications: *See*—
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Etat Francais, Represente Par Le Secretariat D'etat Aux Post Es Et Telecommunications (Centre National D'etudes Des Telecommunications): *See*—
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Smith, Kim R.; Sauer, Joe D.; and Borland, James E., 4,883,917, Cl. 564-292.000.

Etter, Robert M.; and Neumiller, Phillip J., to S. C. Johnson & Son, Inc. Metallic substrate having an adherent photo-product coating on its surface and a method of coating said metallic substratem14,883,540, Cl. 134-1.000.

Eurosteel s.a.: *See*—
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Eusemann, Roland K.; Oepen, Heinrich A.; and Hammers, Anton, to U.S. Philips Corporation. Rotary or linear electric motor whose armature is driven by means of ultrasonic vibrationsm14,884,002, Cl. 310-323.000.

Evea, E. Eugene, II, to Raytheon Company. Constant temperature fryer assemblym14,882,984, Cl. 99-404.000.

Ewing, Richard C., to Baader North America Corporation. Apparatus for processing fishm14,882,811, Cl. 17-58.000.

Exxon Chemical Patents Inc.: *See*—
Cartasegna, Silvestro, 4,883,840, Cl. 525-146.000.
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Eyers, Bud: *See*—
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Ezuka, Daigo: *See*—
Horikawa, Hiroshi; Kudo, Yoshio; Ezuka, Daigo; and Shoji, Takashi, 4,884,259, Cl. 369-32.000.

Failor, Raymond A.; Peters, Gerald; and Reuter, Mark, to Hausted, Inc. Ophthalmic surgery stretcherm14,882,797, Cl. 5-66.000.

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Fairman, Patricia D.: *See*—
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Fajt, Ludvik: *See*—
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Fallstrom, Robert D.: *See*—
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Fan, Steve T., to General Mills, Inc. Controlled atmosphere cut fruit package and methodm14,883,674, Cl. 426-118.000.

Fantle, Willard E., Jr. Baseball bingo gamem14,883,636, Cl. 273-269.000.

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Farnaam, Mohammad: *See*—
Dixit, Pankaj; Sliwa, Jack; Klein, Richard K.; Sander, Craig S.; and Farnaam, Mohammad, 4,884,123, Cl. 357-71.000.

Farr, Glyn P. R., to Lucas Industries. Hydraulic anti-lock braking systems for vehiclesm14,883,327, Cl. 303-116.000.

Fast, Jacob. Product information tag with specialized mounting portionm14,882,868, Cl. 40-657.000.

Fattaruso, John W., to Texas Instruments Incorporated. Comparator circuit having a fast recovery timem14,883,987, Cl. 307-355.000.

Fay, Fredric S.: *See*—
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Federal-Mogul Corporation: *See*—
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Feilchenfeld, Natalie B.; Fuerniss, Stephen J.; Glenning, John J.; Pawlowski, Walter P.; Phelan, Giana M.; and Rickerl, Paul G., to International Business Machines Corporation. Forming a polymide pattern on a substratem14,883,744, Cl. 430-325.000.

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Ferro, Gregory A., to Imi-Tech Corporation. Recurable and cured cellular materialsm14,883,827, Cl. 521-184.000.

Fetzer, Gerhard; and Bader, Eugen, to Stahlecker, Fritz; and Stahlecker, Hans. Opening roller for an opening device of an open-end spinning machinem14,882,812, Cl. 19-112.000.

Fiberglas Canada, Inc.: *See*—
Meunier, Paul J.; Lunt, James; and MacPherson, Edwin J., 4,883,824, Cl. 521-88.000.

Fickweller, Werner: *See*—
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Field, Lamar; Musallam, Hikmat A.; Macke, Jeffrey D.; and Srivastava, Pramod K., to Vanderbilt University. Unsymmetrical organic disulfide compounds useful as antiradiation agentsm14,883,890, Cl. 558-61.000.

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Fischer, John R.: *See*—
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Fischer, Robert J. Digital chess clockm14,884,255, Cl. 368-96.000.

Fish, Hugh R. A., to Microfloor Systems Limited. Access floor constructionm14,883,503, Cl. 52-220.000.

Fisher, Patrick; Stifelman, Jack; Connelly, John F.; Theisen, Jeff J.; and Fisher, Patrick, to Donaldson Company, Inc. Relief valve assembly; piston member from same and filter head assembly incorporating samem14,883,083, Cl. 137-110.000.

Fisher, Patrick: *See*—
Fisher, Patrick; Stifelman, Jack; Connelly, John F.; Theisen, Jeff J.; and Fisher, Patrick, 4,883,083, Cl. 137-110.000.

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Fitzgerald, Patrick H.; Rao, Nandakumar S.; Vinod, Yashavant; V.; and Alender, Jeffrey R., to Du Pont de Nemours, E. I., and Company. Stain-resistant agents for textilesm14,883,839, Cl. 525-136.000.

Fitzpatrick Co., The: *See*—
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Flanagan, Richard E., Jr. Portable receptacle for returnable beverage containersm14,883,169, Cl. 206-170.000.

Flannery, Gene; Crouse, T. Blair; and Patterson, Wesley L., to Abatement Technologies, Inc.; and CPP, Inc. Asbestos containment bag with slide fastener closurem14,883,329, Cl. 312-1.000.

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Fluid Dynamics, Inc.: *See*—
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Fodor, Gabor B.; Sussangkarn, Kawporn; and Veltri, Robert W., to American Biotechnology Company. Condensation products of cyclic diketones and ascorbic acid as immunomodulatory agentsm4,883,808, Cl. 514-468.000.
Fogarty, Kevin E.; Fay, Fredric S.; Isenstein, Louise M.; and Coggins, James M., to University of Massachusetts Medical Center. Filtering in 3-D visual systemm4,884,225, Cl. 364-559.000.
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Forbes, Franklin L.; and Cunningham, Eldon R., to General Electric Company. Electronically commutated motor, blower integral therewith, and stationary and rotatable assemblies thereformm4,883,982, Cl. 310-62.000.
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Bohman, Carl E., 4,883,965, Cl. 250-341.000.
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Francois, Jo'l: *See*—
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Freund, Friedemann; and Batllo, Francois. Method and apparatus for charge distribution analysism4,884,031, Cl. 324-459.000.
Frey, Otto; and Koch, Rudolf, to Sulzer Brothers Limited. Metal bone implantm4,883,492, Cl. 623-23.000.
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Fuji Oil Company, Limited: *See*—
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Hayakawa, Toshiaki, 4,883,748, Cl. 430-567.000.
Horikawa, Hiroshi; Kudo, Yoshio; Ezuka, Daigo; and Shoji, Takashi, 4,884,259, Cl. 369-32.000.
Iwata, Yuzo; Makiuchi, Hajime; and Kitajima, Masao, 4,884,213, Cl. 364-497.000.
Kawada, Yukihiro; and Nakayama, Yoshiaki, 4,883,360, Cl. 356-402.000.
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Sugimoto, Naohiko; and Fujita, Akira, 4,883,577, Cl. 204-299.00R.
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Fujii, Yoshihal, to Sharp Kabushiki Kaisha. Automatic document feeder in electrophotographic copying machinem4,883,266, Cl. 271-291.000.
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Fujita, Fumiyoshi: *See*—
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Fujitani, Takashi; Uemura, Hiromi; Kishimoto, Toshiaki; Uchiyama, Masayuki; Shirasu, Isao; Kurokawa, Hideyuki; Nishioka, Takashi; Kikukawa, Kenji; and Sato, Yoshinori, to Hokkaido Electric Power Co., Inc., The; Kansai Electric Power Co., Inc., The; Shikoku Electric Power Co., Inc.; Kyushu Electric Power Co., Inc.; Japan Atomic Power Company, The; Mitsubishi Jukogyo Kabushiki Kaisha; and Japan Steel Works, Ltd., The. Suspension type transporter for a bolt drawing machine and positioning controller thereformm4,883,185, Cl. 212-147.000.
Fujitsu Limited: *See*—
Enomoto, Hiromu; Dohgome, Hirofumi; Kumagai, Masao; Nakamura, Toru; and Yoshiyama, Kimitaka, 4,883,975, Cl. 307-290.000.
Inagami, Fujio, 4,884,294, Cl. 379-61.000.
Kasai, Kazumi; Itoh, Hiromi; Tanaka, Hitoshi; Oh-hori, Tatsuya; and Komeno, Junji, 4,883,020, Cl. 118-719.000.
Kobayashi, Masanori, 4,883,775, Cl. 437-225.000.
Nishimoto, Hiroshi; Touge, Takashi; Okiyama, Tadashi; Kuwata, Naoki; and Arai, Yasunari, 4,884,278, Cl. 372-26.000.
Fukao, Tomohisa: *See*—
Tanaka, Shigeo; Sakai, Jiro; Fukao, Tomohisa; Wakatsuki, Kizuku; and Wakamatsu, Kazuki, 4,883,842, Cl. 525-240.000.

Fukase, Hisahiko: *See*—
Matsui, Kunio; Fukase, Hisahiko; Hirata, Atsushi; and Nomura, Akihiro, 4,883,113, Cl. 164-428.000.

Fukuda, Tatsuhisa: *See*—
Koyabu, Seiji; and Fukuda, Tatsuhisa, 4,884,253, Cl. 368-10.000.

Fukuda, Tsuguhiro; Sato, Hiroshi; and Nakajima, Kazuhiro, to Canon Kabushiki Kaisha. Correction sheet and correction methodml4,883,379, Cl. 400-697.100.

Fukudome, Katsuyuki: *See*—
Mori, Ryuichiro; Akiyama, Tatsuhiko; and Fukudome, Katsuyuki, 4,884,124, Cl. 357-72.000.

Fukumoto, Ryoichi: *See*—
Asada, Toru; Komuro, Kenichi; Fukumoto, Ryoichi; and Torii, Nozomu, 4,884,207, Cl. 364-431.030.

Fukunaga, Takahiro: *See*—
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Fukushima, Hitoshi; Takei, Katsumori; Iwamoto, Kohei; and Nakamura, Hiroto, to Seiko Epson Corporation. Magnetic ink and method of printingml4,884,081, Cl. 346-74.600.

Fukuzawa, Hiroshi: *See*—
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Fuller Research Corporation: *See*—
Fuller, Terry A.; and Kwasegroch, John G., 4,883,054, Cl. 128-303.100.

Fuller, Terry A.; and Kwasegroch, John G., to Fuller Research Corporation. Optical fiber break detectorml4,883,054, Cl. 128-303.100.

Furukawa Electric Co., Ltd., The: *See*—
Chiba, Kazuo; Ohishi, Yoshiaki; Migita, Jituo; Mochizuki, Hajime; and Kobayashi, Takao, 4,883,950, Cl. 235-440.000.
Tamura, Junichi; Hara, Ryoichi; Abe, Fumihiko; and Koaizawa, Hisashi, 4,884,290, Cl. 378-83.000.

Furuya, Yonezou: *See*—
Kobayashi, Osamu; Furuya, Yonezou; Isida, Takeshi; and Mikami, Mitsugu, 4,883,158, Cl. 194-217.000.

Fusco, Angelo: *See*—
Dziura, Walter H.; Fusco, Angelo; and Khosravi, Parviz, 4,882,824, Cl. 29-33.200.

Futamata, Shinichiro, to Kabushiki Kaisha Toshiba. Radiation-type diagnosis apparatusml4,883,960, Cl. 250-327.200.

Futamura, Shoji: *See*—
Ozaki, Sei; Inoue, Satoru; and Futamura, Shoji, 4,883,420, Cl. 425-464.000.

Futter, Menachem: *See*—
Sanchez, Hernando; Franczak, Richard M.; and Futter, Menachem, 4,883,197, Cl. 221-26.000.

G.D Societa' per Azioni: *See*—
Belvederi, Bruno, 4,883,076, Cl. 131-84.400.
Gamberini, Antonio; and Draghetti, Fiorenzo, 4,883,163, Cl. 198-460.000.
Mattei, Riccardo, 4,883,074, Cl. 131-84.100.
Mattei, Riccardo; and Rizzoli, Salvatore, 4,883,075, Cl. 131-84.400.
Neri, Armando, 4,882,938, Cl. 73-863.910.

Gabrielyan, Mher; and Brestel, John R., to Gabrielyan, Mher. Drain line apparatusml4,883,102, Cl. 141-98.000.

Gado, Klara: *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Szirt nee Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Jakfalvi, Elemer; Zukovics nee Sumeg, Katalin; Gado, Klara; and Hegedus, Maria, 4,883,798, Cl. 514-256.000.

GAF Corporation: *See*—
Login, Robert B.; Chaudhuri, Ratan K.; Tracy, David J.; and Helioff, Michael W., 4,883,655, Cl. 424-70.000.

Galbani, Benito, to Savio S.p.A. Plate mountable on the base of a bin-type container for the ordered storage of bobbinsml4,883,177, Cl. 206-391.000.

Gamberini, Antonio; and Draghetti, Fiorenzo, to G.D. Societa per Azioni. Apparatus and method for regularly spacing apart randomly spaced objects while conveying themml4,883,163, Cl. 198-460.000.

Gandrez, Jean-Francois; and Daugan, Jean-Claude, to Colgate-Palmolive Company. Napkin-knickers provided with an improved elastic arrangementml4,883,482, Cl. 604-385.200.

Gange, David M.: *See*—
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Gansow, Michael A. P.: *See*—
Marugg, J. E.; Gansow, Michael A. P.; and Thoen, J. A., 4,883,826, Cl. 521-164.000.

Gardlik, John M., to Procter & Gamble Company, The. Oxa-fenchyl amines useful for preparing high intensity sweetenersml4,883,888, Cl. 549-463.000.

Garland, Thomas A. Counterbalancingml4,883,249, Cl. 248-566.000.

Garner, Robert B.; and Agrawal, Anant, to Sun Microsystems, Inc. Single cycle processor/cache interfaceml4,884,198, Cl. 364-200.000.

Garshelis, Ivan J., to Mag Dev Inc. Magnetoelastic torque toolml4,882,936, Cl. 73-862.360.

Gartner, Georg F.; Rau, Hans; and Janiel, Peter A., to U.S. Philips Corp. Device for enriching a carrier gas with the vapor of a sparingly volatile substanceml4,883,362, Cl. 366-101.000.

Gates Energy Product, Inc.: *See*—
Anderson, Ronald C., 4,883,729, Cl. 429-179.000.

Gausrab, Klaus; Hauser, Joachim; and Mueller, Robert, to Dr. Ing, h.c.V. Porsch AG. Drive line for four wheel drive vehiclesml4,882,950, Cl. 74-714.000.

Gautreaux, Marcelian F.; and Allen, Robert H., to Ethyl Corporation. Fluid bed process for producing polysiliconml4,883,687, Cl. 427-213.000.

Gay, Christian; and Lassiaz, Philippe, to Valeo. Clutch release bearing, in particular for automotive vehiclesml4,883,155, Cl. 192-98.000.

Gaz De France: *See*—
Belaich, Jean-Pierre; Fardeau, Marie-Laure; Peillex, Jean-Paul; and Pavia, Andre , 4,883,753, Cl. 435-167.000.

Gebhardt, Roland. Signage system support structureml4,882,866, Cl. 40-611.000.

Gebr. Eickhoff Maschinenfabrik und. Eisengieberei mbH: *See*—
Henrich, Friedhelm; and Hellmuth, Werner, 4,883,323, Cl. 299-42.000.

Gebr. Happich GmbH: *See*—
Lang, Manfred, 4,882,956, Cl. 81-20.000.

GECO A.S.: *See*—
Snook, Clive T., 4,884,249, Cl. 367-154.000.

Geiger, Martin: *See*—
Michel, Petra; and Geiger, Martin, 4,884,115, Cl. 357-42.000.

Geisselbrecht, Georg: *See*—
Franetzki, Manfred; Geisselbrecht, Georg; Buchholtz, Gerhard; Fickweller, Werner; and Obermann, Peter, 4,883,467, Cl. 604-152.000.

Gemma, Antoine, to Electricite De France (Service National). Apparatus for survey and/or treatment of a smooth, curved surfaceml4,883,576, Cl. 204-224.00M.

General Dynamics Corp., Pomona Div.: *See*—
Schlunt, Richard S., 4,884,232, Cl. 364-754.000.

General Electric Company: *See*—
Adamson, Arthur P.; and Gliebe, Philip R., 4,883,240, Cl. 244-69.000.
Castonguay, Roger N.; Palmieri, Joseph M.; and Scott, Graham A., 4,884,048, Cl. 335-18.000.
Deakins, Martin E.; Slutz, David E.; Johnson, Neil R.; Clark, Thomas J.; and Bovenkerk, Harold P., 4,883,500, Cl. 51-298.000.
Dziura, Richard A.; Russell, Ronald R.; and Scott, Graham A., 4,884,164, Cl. 361-97.000.
Eichelberger, Charles W.; Wojnarowski, Robert J.; and Welles, Kenneth B., II, 4,884,122, Cl. 357-71.000.
Forbes, Franklin L.; and Cunningham, Eldon R., 4,883,982, Cl. 310-62.000.
Gray, Peter V.; Baliga, Bantval J.; Chang, Mike F. S.; and Pifer, George C., 4,883,767, Cl. 437-41.000.
Isnardi, Michael A.; and Hurst, Robert N., Jr., 4,884,127, Cl. 358-12.000.
Patsfall, Ralph E., 4,883,216, Cl. 228-119.000.
Raymond, Eugene B., 4,882,972, Cl. 89-34.000.
Reigel, James R.; Corsmeier, Robert J.; Bertke, James H.; and Lenahan, Dean T., 4,882,902, Cl. 60-39.750.
Rink, Frederick J., Jr., 4,883,995, Cl. 310-55.000.
Sable, Daniel M., 4,884,183, Cl. 363-41.000.

General Hospital Corporation, The: *See*—
Nathanson, James A., 4,883,801, Cl. 514-263.000.

General Mills, Inc.: *See*—
Fan, Steve T., 4,883,674, Cl. 426-118.000.

General Motor Corporation: *See*—
Campbell, Adrian D.; and Rank, William E., 4,882,805, Cl. 16-93.00R.

General Motors Corporation: *See*—
Finn, Bernard J.; and Hawkins, Gene R., 4,883,288, Cl. 280-672.000.
Lakey, Leroy E.; Peter, David A.; Chance, David A.; and Anderson, Stephen W., 4,883,973, Cl. 290-31.000.
Verbrugge, Mark W.; and Carpenter, Michael K., 4,883,567, Cl. 204-39.000.

General Signal Corp.: *See*—
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Genevois, Christophe, to Axytel S.A. Capacitive apparatus to monitor the integrity of a wallml4,884,061, Cl. 340-550.000.

Georg Fischer AG: *See*—
Overath, Friedhelm; and Weyer, Michael, 4,883,550, Cl. 156-171.000.

Gerard, Claude, to Saft S.A. Support frame for storage battery cellsml4,883,725, Cl. 429-99.000.

Gerfast, Sten R. Dynamoelectric machine having ironless stator coilml4,883,981, Cl. 310-40.00R.

Gerritsen, Jan: *See*—
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Gerstel, Eberhard. Gas chromatographml4,883,504, Cl. 55-67.000.

Gessner Industries, Inc.: *See*—
MacKinnon, Francis X.; Horn, James F.; and Pastina, John A., 4,882,820, Cl. 26-93.000.

GFM Gesellschaft fur Fertigungstechnik und Maschinenbau Gesellschaft m.b.H.: *See*—
Blaimschein, Gottfried, 4,884,210, Cl. 364-474.010.

Ghorashi, Hamid M., to Du Pont de Nemours, E. I., and Company. Process for dyeing crystalline aromatic polyamide fibers with water-insoluble dyesml4,883,496, Cl. 8-476.000.

Giannetti, John; Couture, Robert L.; and Sieve, Jerry F., to Eastman Kodak Company. Duplex document handlerml4,884,097, Cl. 355-23.000.

Gibson, Alan F.: *See—*
Kilbane, Farrell M.; Coleman, Richard A.; Dunbar, Frank C.; and Gibson, Alan F., 4,883,723, Cl. 428-653.000.

Gielis, Gerardus C. M.; Bogers, Antonius J. P.; and Van Lerberghe, Steven J. W., to U.S. Philips Corporation. Digital lattice filterml4,884,230, Cl. 364-724.150.

Gigler, Gabor: *See—*
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Szirt nee Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Jakfalvi, Elemer; Zukovics nee Sumeg, Katalin; Gado, Klara; and Hegedus, Maria, 4,883,798, Cl. 514-256.000.

Giles, Charles E.; and Clifton, Richard J., to C & R Pier Manufacturing. Mobile home anchorml4,882,887, Cl. 52-126.600.

Gill, William A.: *See—*
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Gitel, Sanford N.; and Wessler, Stanford, to New York University. Specific immunoassay for heparinml4,883,751, Cl. 435-7.000.

Giusti, Giambattista; and Duyckinck, Robert W. Multi stage gas inlet construction for dust collectorsml4,883,509, Cl. 55-326.000.

Giusti, Giambattista; and Duyckinck, Robert W. Gas inlet construction for fabric filter dust collectionsml4,883,510, Cl. 55-326.000.

Glaeser, Linda C.; Brazdil, James F., Jr.; and Toft, Mark A., to Standard Oil Company, The. Method for ammoxidation of paraffins and catalyst system thereformml4,883,896, Cl. 558-319.000.

Glaeser, Linda C.: *See—*
Brazdil, James F., Jr.; Glaeser, Linda C.; and Toft, Mark A., 4,883,895, Cl. 558-319.000.

Glancy, John J. Cushion wedge for custom control of impact and pronation upon heel-strike in various weights of wearersml4,882,856, Cl. 36-43.000.

Glasstech International L.P.: *See—*
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Glaxo Group Limited: *See—*
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Glazer, Alexander N.: *See—*
Whiteley, Norman M.; Hunkapiller, Michael W.; and Glazer, Alexander N., 4,883,750, Cl. 435-6.000.

Glazier, Stephen C. Non-reusable syringeml4,883,466, Cl. 604-110.000.

Glazier, Stephen C. Guard assembly for hypodermic needleml4,883,469, Cl. 604-192.000.

Glemet, Michel; and Cognet, Gilles, to Societe Atochem. Process for the manufacture of sections of thermoplastic resin reinforced with continuous fibersml4,883,625, Cl. 264-136.000.

Glenning, John J.: *See—*
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Gliebe, Philip R.: *See—*
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Glockmann, Walter; and Herwig, Thomas, to Heimann GmbH. X-ray scanner for detecting plastic articlesml4,884,289, Cl. 378-57.000.

Gmitter, Thomas J.; and Yablonovitch, Eli, to Bell Communications Research, Inc. Lift-off and subsequent bonding of epitaxial filmsml4,883,561, Cl. 156-633.000.

Goddard, John; and Taylor, Peter, to Plessey Overseas Limited. Fuel supply systemsml4,883,410, Cl. 417-69.000.

Godfrey, Christopher R. A.: *See—*
Clough, John M.; Godfrey, Christopher R. A.; de Fraine, Paul J.; and Snell, Brian K., 4,883,807, Cl. 514-427.000.

Goesele, Ulrich M.; and Stengl, Reinhard J., to Duke University. Method for bubble-free bonding of silicon waferml4,883,215, Cl. 228-116.000.

Gohbayashi, Masayoshi; Narita, Noritsugu; and Maruno, Makoto, to Yoshitomi Pharmaceutical Industries, Ltd. Method of producing tetrakis[3-(3,5-di-tert-butyl-4-hydroxyphenyl)propionyloxymethyl]-methaneml4,883,902, Cl. 560-75.000.

Gohshi, Seiichi: *See—*
Ninomiya, Yuichi; Ohtsuka, Yoshimichi; Izumi, Yoshinori; Gohshi, Seiichi; and Shishikui, Yoshiaki, 4,884,136, Cl. 358-105.000.

Goldman, Diana L.; and Goldman, Michael S. Hypodermic needle removal and disposal deviceml4,883,173, Cl. 206-366.000.

Goldman, Michael S.: *See—*
Goldman, Diana L.; and Goldman, Michael S., 4,883,173, Cl. 206-366.000.

Goldstar Co., Ltd.: *See—*
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Gomoll, Gunter; and Hauslaib, Wolfgang, to Mannesmann Aktiengesellschaft. Device for tensioning of a pulling element of a printerml4,883,445, Cl. 474-113.000.

Gonet, Patrick: *See—*
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Gonzalez, Carlos F., to Microlife Technics, Inc. Method for inhibiting bacterial spoilage and resulting compositionsml4,883,673, Cl. 424-195.100.

Goodman, Jack J.; Tauman, Harvey S.; Fox, Charles; and Hart, Thomas J., to Dento-Med Industries, Inc. Skin treatment preparationml4,883,659, Cl. 424-78.000.

Goodspeed, Byron L. Tamper-proof locking deviceml4,883,294, Cl. 292-148.000.

Goradesky, Gerald. Means for manually holding a stack of karate boardsml4,883,635, Cl. 272-76.000.

Gorgenyi, Frigyes: *See—*
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Gossen, Richard N., Jr.; Bruncke, William C.; and Baker, Gordon D., to Texas Instruments Incroporated. Shielding for implant in manufacture of dynamic memoryml4,883,543, Cl. 437-37.000.

Goto, Fumio; and Otawa, Taro, to Namba Press Works Co., Ltd. Method for shaping thermoplastic fabricsml4,883,632, Cl. 264-544.000.

Goto, Kinji: *See—*
Kitamura, Yoshiaki; and Goto, Kinji, 4,883,090, Cl. 137-625.410.

Goto, Kunihiro, to NEC Corporation. Repeater arrangement capable of avoiding accumulation of stuff jittersml4,884,268, Cl. 370-102.000.

Goto, Masahiro: *See—*
Kuge, Tsukasa; Goto, Masahiro; and Sakane, Isamu, 4,883,715, Cl. 428-421.000.

Goto, Masao: *See—*
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Gould, Gregory. Method and apparatus for auditing means used for measuring characteristics of a bulk materialml4,882,927, Cl. 73-1.00R.

Gowin, Robert: *See—*
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Graco Inc.: *See—*
Ouarve, Vernon K.; and McCormick, Dennis L., 4,883,199, Cl. 222-14.000.

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Graf, Albert C. Sealed solder connector assembly and method of useml4,883,925, Cl. 174-84.00R.

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Grantham, Daniel H.: *See—*
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Graton, Michel: *See—*
Rohrle, Dieter; Graton, Michel; and Lhermitte, Philippe, 4,883,156, Cl. 192-106.200.

Gravemann, Horst, to Kabel-und Metallwerke G. AG. Method of casting and mold makingml4,883,112, Cl. 164-459.000.

Gray, Peter V.; Baliga, Bantval J.; Chang, Mike F. S.; and Pifer, George C., to General Electric Company. Method of fabricating self aligned semiconductor devicesml4,883,767, Cl. 437-41.000.

Gray, Thelma, to Made with Love, Inc. Precut and partially assembled clothingml4,882,788, Cl. 2-243.00R.

Green, Andrew P.: *See—*
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Green, Kenneth P. Plant holder apparatusml4,882,875, Cl. 47-79.000.

Greenhut, Bart E., to Rosen, Leon D. Chart recorderml4,884,084, Cl. 346-136.000.

Greiner, Leonard: *See—*
Perry, John H., Jr.; Bhatt, Bharat K.; Capps, Jesse; Eldridge, Paul M.; Greiner, Leonard; Lockyer, Robert W.; Martin, Michelle; McNeice, Raymond R.; Misiaszek, Steven M.; Perry, Stanton S.; Sullivan, Thomas F.; and Campbell, Paul G., 4,883,823, Cl. 518-702.000.

Grice, Jeremy H.: *See—*
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Grieve, Duncan M. A.; Poon, Stephen S. C.; Thien, Tran V.; Sakizadeh, Kumars; and Weigel, David C., to Minnesota Mining and Manufacturing Company. Color photothermographic elementsml4,883,747, Cl. 430-542.000.

Griffis, Steven C. Portable isolation enclosureml4,883,512, Cl. 55-356.000.

Griffith Laboratories, Limited, The: *See—*
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Grill, Erwin; Winnacker, Ernst-Ludwig; and Zenk, Meinhart H., to Consortium fur Elektrochemische Industrie GmbH. Cysteine-rich peptides having gamma-glutamic acid and beta-alanine units, a process for their preparation and their useml4,883,861, Cl. 530-326.000.

Grimm, Daniel: *See—*
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Grint, Alan: *See—*
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Groeger, Klaus: *See—*
Ampferer, Herbert; and Groeger, Klaus, 4,883,031, Cl. 123-195.00C.

Grosjean, Pierre, to Rhone-Poulenc Films. Thick composite polyester filmsml4,883,706, Cl. 428-215.000.

Gross, Edward J., to Sundawn Inc. Winter front for the grill of a motor vehicleml4,883,139, Cl. 180-68.600.

Gross, Edward J., to Sundawn Inc. Deflector screen for motor vehicleml4,883,303, Cl. 296-91.000.

Gross, Richard L., to Wilson Jones Company. Nonmagnetic copyholder and clipml4,882,863, Cl. 40-352.000.
Gross, Steven E. Hunting jacket including arm support for use while carrying a gunml4,882,786, Cl. 2-94.000.
Grubbs, Robert H.; and Novak, Bruce M., to California Institute of Technology. Ring opening metathesis polymerization of strained cyclic ethersml4,883,851, Cl. 526-268.000.
Grundei, Hans; Hipp, Erwin; and Heinhuber, Bernd, to S&G Implants GmbH. Pelvis part prosthesisml4,883,489, Cl. 623-22.000.
Grzesik, Ulrich: *See*—
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GTE Laboratories Incorporated: *See*—
Dunn, Edmund M.; Kang, Shinhoo; and Wei, George C., 4,883,217, Cl. 228-122.000.
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GTE Products Corporation: *See*—
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Jones, Gerald M.; and Nemcovsky, Rhonda L., 4,882,838, Cl. 29-829.000.
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Hardy, Thomas A.; and Walsh, Edward N., to Akzo America Inc. Phosphate and phosphonate compoundsml4,883,892, Cl. 558-164.000.
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Hiramatsu, Tohru, to Juki Corporation. Method of and apparatus for controlling sewing rate in sewing machineml4,883,008, Cl. 112-262.100.
Hirano, Hiroshi: *See*—
Yashiki, Seiji; Hirano, Hiroshi; and Sasaki, Kazutomo, 4,883,034, Cl. 123-339.000.
Hirano, Mikio: *See*—
Nishino, Toshikazu; Miyake, Mutsuko; Kawabe, Ushio; Harada, Yutaka; Aoki, Masaaki; and Hirano, Mikio, 4,884,111, Cl. 357-05.000.
Hirata, Atsushi: *See*—
Matsui, Kunio; Fukase, Hisahiko; Hirata, Atsushi; and Nomura, Akihiro, 4,883,113, Cl. 164-428.000.
Hirayama, Kuniaki: *See*—
Hiramatsu, Hiromichi; Odashima, Hitoshi; Hirayama, Kuniaki; and Ohji, Toshio, 4,882,833, Cl. 29-596.000.
Hiroi, Masakazu: *See*—
Iida, Noriyoshi; Uto, Nobutaka; Hiroi, Masakazu; and Hoshi, Akimitsu, 4,883,265, Cl. 271-220.000.
Hirosawa, Makoto, to Dainippon Screen Mfg. Co., Ltd. Method for generating image contour data and apparatus thereforml4,884,224, Cl. 364-550.000.
Hirose, Ichiro; Sagawa, Takayoshi; Tani, Shichisei; and Kato, Katsuo, to Japan Tobacco Inc. Transport system for transporting rod-shaped objects in an air flowml4,883,078, Cl. 131-280.000.
Hirose, Masao: *See*—
Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, 4,883,879, Cl. 546-280.000.
Hiruma, Eikiyu: *See*—
Ogawa, Hirofumi; Sameshima, Kenji; Hirai, Tadaaki; Unnai, Takaaki; Yamamoto, Masanao; Shidara, Keiichi; Yamazaki, Junichi; Hiruma, Eikiyu; and Suzuki, Shirou, 4,883,562, Cl. 156-643.000.
Hishinuma, Kazuhiro: *See*—
Kimura, Tsutomu; and Hishinuma, Kazuhiro, 4,884,200, Cl. 364-413.130.
Hishiyama, Sadao: *See*—
Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita, Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, 4,883,711, Cl. 428-336.000.
Hitachi Cable, Ltd. & Hitachi, Ltd.: *See*—
Abe, Tomiya; Shimazaki, Yukio; Ishibashi, Takanobu; Abe, Norimoto; Asai, Takayasu; and Taketani, Noriaki, 4,883,338, Cl. 350-96.340.
Hitachi Keiyo Engineering Co., Ltd.: *See*—
Sarugaku, Shinichi, 4,883,938, Cl. 219-124.340.
Hitachi, Ltd.: *See*—
Ando, Takeki; Nakamura, Kiyoshi; Mine, Toshisuke; Inaba, Hiromi; Kurosawa, Toshiaki; Nakazato, Masao; and Sakai, Yoshio, 4,884,182, Cl. 363-37.000.
Endo, Norikazu, 4,884,195, Cl. 364-200.000.
Harada, Eiji; Matsuzaki, Hitoshi; Tomita, Sigeo; and Chida, Katsunori, 4,884,126, Cl. 357-81.000.
Hiramatsu, Hiromichi; Odashima, Hitoshi; Hirayama, Kuniaki; and Ohji, Toshio, 4,882,833, Cl. 29-596.000.
Hosoki, Shigeyuki; Hosaka, Sumio; and Takata, Keiji, 4,883,959, Cl. 250-306.000.
Ide, Akira; and Saito, Yoshikazu, 4,883,988, Cl. 307-443.000.
Maruyama, Youzi; Ikeda, Tadashi; and Suzuki, Ryo, 4,884,236, Cl. 365-29.000.
Matsui, Takayuki; Okuyama, Toshiaki; Matsutake, Mitsugu; Takahashi, Junichi; and Ito, Masami, 4,884,184, Cl. 363-46.000.
Natori, Tatsuo; Shimaguchi, Takashi; Watanabe, Akihide; and Yamada, Toshihiro, 4,883,621, Cl. 264-86.000.
Ogawa, Hirofumi; Sameshima, Kenji; Hirai, Tadaaki; Unnai, Takaaki; Yamamoto, Masanao; Shidara, Keiichi; Yamazaki, Junichi; Hiruma, Eikiyu; and Suzuki, Shirou, 4,883,562, Cl. 156-643.000.
Ohki, Nobuaki; Sengoku, Norio; and Kobayashi, Fumiyuki, 4,884,170, Cl. 361-414.000.
Onodera, Shuji; Sato, Taichi; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Yamada, Yoko; Yamaguchi, Yuzo; Takeuchi, Yoshinori; Hara, Shigeo; and Setone, Shouichi, 4,884,154, Cl. 360-104.000.
Ozawa, Naoki; Akiyama, Toshiyuki; Takahashi, Kenji; Mimura, Itaru; and Nakano, Takahiro, 4,884,129, Cl. 358-44.000.
Sarugaku, Shinichi, 4,883,938, Cl. 219-124.340.
Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita, Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, 4,883,711, Cl. 428-336.000.
Sugimoto, Koichi; Hirabayashi, Hisaaki; and Masui, Tomoyuki, 4,884,015, Cl. 318-640.000.
Hitachi, Ltd. & Hitachi Iruma Electronic Corp., Ltd.: *See*—
Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, 4,883,342, Cl. 350-320.000.

Hitachi, Ltd. & Nippon Hoso Kasai: *See*—
Makishima, Tatsuo; Hirai, Tadaaki; Tsuji, Kazutaka; Ishioka, Sachio; Yamashita, Takashi; Shidara, Keiichi; Yamazaki, Junichi; and Aiba, Masaaki, 4,884,011, Cl. 315-368.000.
Hobes, John; Payer, Wolfgang; and Bexten, Ludger, to Ruhrchemie Aktiengesellschaft. Copolymers of ethylene and 2,4,4-trimethylpentene-1ml4,883,853, Cl. 526-329.000.
Hobot, Christopher M.: *See*—
Coury, Arthur J.; and Hobot, Christopher M., 4,883,854, Cl. 528-28.000.
Hock, Darryl A.: *See*—
Zboralski, James A.; Hock, Darryl A.; and Kaleita, David L., 4,884,215, Cl. 364-510.000.
Hoda, Takeo: *See*—
Inoue, Manabu; Taniguchi, Nobuyuki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,884,092, Cl. 354-289.100.
Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 4,884,089, Cl. 354-222.000.
Hodgkiss, Douglas H.: *See*—
Thiel, Geoffrey L.; Hodgkiss, Douglas H.; and Tohara, Hisanori, 4,884,196, Cl. 364-200.000.
Hodogaya Chemical Co., Ltd.: *See*—
Sato, Masatoshi; Ogawara, Kensuke; and Emura, Noriaki, 4,883,702, Cl. 428-141.000.
Hoechst Aktiengesellschaft: *See*—
Bothe, Lothar; Crass, Guenther; Janocha, Siegfried; and Schloegl, Gunter, 4,883,698, Cl. 428-35.900.
Jaeckel, Lothar; Kleber, Rolf; and Mees, Bernhard, 4,883,495, Cl. 8-115.600.
Keller, Reinhold; Schlingmann, Merten; and Platen, Martin, 4,883,900, Cl. 560-41.000.
Hoechst Celanese Corporation: *See*—
Elongo, Varadaraj, 4,883,901, Cl. 560-45.000.
Hoechst-Roussel Pharmaceuticals, Inc.: *See*—
Hamer, R. Russell L.; Effland, Richard C.; and Klein, Joseph T., 4,883,794, Cl. 514-248.000.
Hrib, Nicholas J., 4,883,885, Cl. 549-214.000.
Kosley, Raymond W., Jr.; and O'Malley, Gerard J., 4,883,793, Cl. 514-228.200.
Hoep, Antoon L.: *See*—
Berkhout, Ronald; Van Stiphout, Johannes G. V.; Corver, Jozef; A. W. M.; Hoep, Antoon L.; and Knapen, Berend J., 4,884,188, Cl. 346-160.100.
Hoffend, Thomas R.; and Jugle, Don B., to Xerox Corporation. Electrophotographic toner and developer compositions with polymeric alcohol waxesml4,883,736, Cl. 430-110.000.
Hoffman-La Roche Inc.: *See*—
Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, 4,883,614, Cl. 260-413.000.
Hoffman-LaRoche, Inc.: *See*—
Pak, Charles Y. C.; Uskokovic, Milan R.; and Zerwekh, Joseph E., 4,883,791, Cl. 514-167.000.
Hoffmann, Axel: *See*—
Konrad, Eugen; Mager, Herbert; and Hoffmann, Axel, 4,883,656, Cl. 424-70.000.
Hoffmann, Dietrich: *See*—
Reuter, Ingolf; Hoffmann, Dietrich; and Weisser, Harald, 4,882,974, Cl. 89-41.160.
Hoffmann, Gunther, to Wandel & Goltermann GmbH & Co. Regulated direct-current converterml4,884,180, Cl. 363-21.000.
Hoffmann, Hans: *See*—
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Hoffmann-La Roche Inc.: *See*—
Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, 4,883,613, Cl. 260-408.000.
Aschwenden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, 4,883,815, Cl. 514-541.000.
Bernhard, Kurt; Jaggli, Stephan; Kreienbuhl, Paul; and Schwieter, Ulrich, 4,883,887, Cl. 549-341.000.
Hohrman, Harlan W. Removable trailer hitchml4,883,285, Cl. 280-491.500.
Hokkaido Electric Power Co., Inc., The: *See*—
Fujitani, Takashi; Uemura, Hiromi; Kishimoto, Toshiaki; Uchiyama, Masayuki; Shirasu, Isao; Kurokawa, Hideyuki; Nishioka, Takashi; Kikukawa, Kenji; and Sato, Yoshinori, 4,883,185, Cl. 212-147.000.
Holderfield, Daron C.; Martin, Bernard E.; and Russell, Samuel S., to United States of America, Army. Manual microcircuit die test systemml4,884,027, Cl. 324-158.00F.
Holen, James T.; and Kazlauskas, Vidas P., to Abbott Laboratories. Sample processor card for centrifugeml4,883,763, Cl. 436-45.000.
Hollingsworth, Walter H.: *See*—
Sachs, Howard G.; Cho, James Y.; and Hollingsworth, Walter H., 4,884,197, Cl. 364-200.000.
Holly, Frank J. Ophthalmic solution for treatment of dry-eye syndromeml4,883,658, Cl. 424-80.000.
Holmes, Peter G.; Lowe, Michael; and Donaghue, Christopher, to Norprint International Limited. Baggage and security label, primarily for use by airlinesml4,882,861, Cl. 40-299.000.
Holowczenko, Alex, to Carrier Corporation. Method for making an infrared burnerml4,883,423, Cl. 431-328.000.
Holter, John W. Attitude and pressure responsive valveml4,883,456, Cl. 604-9.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Nakazawa, Yoshihiro; Kudou, Masayuki; Iijima, Satoshi; Sanada, Katsuiki; and Matsuo, Yoshihiro, 4,883,284, Cl. 280-293.000.
Oikawa, Toshihiro; Tanai, Tsuneo; Yamada, Noriyuki; Saka, Tsutomu; and Kobayashi, Toshiki, 4,883,027, Cl. 123-90.160.
Toshimitsu, Kazushige; Ueno, Masayuki; and Igarashi, Hisashi, 4,883,039, Cl. 123-463.000.
Honeywell, Inc.: *See*—
Atherton, James H.; and Stanojevic, Silvo, 4,884,161, Cl. 361-18.000.
Dawson, John F.; Bednarski, Joseph W.; Stoffer, Marie A.; and Cousens, James A., 4,884,220, Cl. 364-521.000.
Lee, Kang W.; and Rabe, Robert L., 4,884,238, Cl. 365-105.000.
Hoover Universal, Inc.: *See*—
Barth, John M., 4,883,188, Cl. 215-12.100.
Scott, Glenn, 4,883,319, Cl. 297-354.000.
Hopkins, Thomas R., to Phillips Petroleum Company. Fermentation method and apparatusml4,883,759, Cl. 435-289.000.
Hori, Toshio: *See*—
Tanabe, Takeshi; and Hori, Toshio, 4,883,920, Cl. 174-68.500.
Horiba, Ltd.: *See*—
Kotani, Haruo; Tomita, Katsuhiko; Yada, Takaaki; and Nakanishi, Tsuyoshi, 4,883,563, Cl. 156-645.000.
Horiguchi, Akihiro: *See*—
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; Tsuge, Akihiko; Imagawa, Hiroshi; Takano, Takeshi; Ueno, Fumio; Horiguchi, Akihiro; and Inoue, Hiroshi, 4,883,780, Cl. 501-96.000.
Horikawa, Hiroshi; Kudo, Yoshio; Ezuka, Daigo; and Shoji, Takashi, to Fuji Photo Film Co., Ltd. Optical memory disk and track access thereformml4,884,259, Cl. 369-32.000.
Horley, Susan M.: *See*—
Abboud, George E.; Such, Christopher H.; Horley, Susan M.; and Waters, Julian A., 4,883,873, Cl. 544-316.000.
Horn, James F.: *See*—
MacKinnon, Francis X.; Horn, James F.; and Pastina, John A., 4,882,820, Cl. 26-93.000.
Horn, John J., to PBS Building Systems, Inc. Architectural modular systemml4,882,883, Cl. 52-79.100.
Hornschemeyer, Heinz, to Marker Deutschland GmbH. Toe piece for safety ski bindingml4,883,286, Cl. 280-629.000.
Horsch, Heinrich. Device for photographic monitoring of crossroadsml4,884,072, Cl. 340-937.000.
Horton, Paul F. Collapsible canopy for pickup trucksml4,883,305, Cl. 296-105.000.
Hosaka, Sumio: *See*—
Hosoki, Shigeyuki; Hosaka, Sumio; and Takata, Keiji, 4,883,959, Cl. 250-306.000.
Hoshi, Akimitsu: *See*—
Iida, Noriyoshi; Uto, Nobutaka; Hiroi, Masakazu; and Hoshi, Akimitsu, 4,883,265, Cl. 271-220.000.
Hoskins, Michael K., to Ciba Corning Diagnostics Corp. Stabilized isoenzyme control productsml4,883,762, Cl. 436-18.000.
Hoskinson, Gordon H. Secondary combustion chamber for an incineratorml4,883,003, Cl. 110-212.000.
Hosoe, Katsuharu; Itoh, Teruyoshi; Tachi, Ryosuke; and Nojiri, Takao, to Nippondenso Co., Ltd. Ignition timing control system for internal combustion enginesml4,883,033, Cl. 123-335.000.
Hosoi, Yuichi: *See*—
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Hosoki, Shigeyuki; Hosaka, Sumio; and Takata, Keiji, to Hitachi, Ltd. Scanning surface microscope using a micro-balance device for holding a probe-tipml4,883,959, Cl. 250-306.000.
Hot Locks, Inc.: *See*—
Stanich, Judith A., 4,882,918, Cl. 70-54.000.
Houts, Thomas M.; and Ullman, Edwin F., to Syntex (U.S.A) Inc. Method for producing chromatographic devices having modified edgesml4,883,688, Cl. 427-285.000.
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Howard, Mig A., to Hughes Tool Company. Wellbore tool with hall effect couplingml4,884,071, Cl. 340-854.000.
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Maserang, William L.; and Wright, John W., 4,884,171, Cl. 361-424.000.
Hoxan Corporation: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,883,452, Cl. 600-36.000.
Hoy, Martin L.; and Hurst, Aubrey B. Paper scoring apparatusml4,883,451, Cl. 493-396.000.
Hoya Corporation: *See*—
Kusumi, Yasuo; Uno, Ken; and Fujino, Takuo, 4,882,827, Cl. 29-527.200.
Onoki, Fumio, 4,883,548, Cl. 156-99.000.
Hrib, Nicholas J., to Hoechst-Roussel Pharmaceuticals Inc. Oxolabdanesml4,883,885, Cl. 549-214.000.
Hsieh, Min-Lang; Huang, Jan-Hong; Jan, Lian; and Guan, Gang-Shyr, to Industrial Technology Research Institute. Automated apparatus for transporting, lining-up and stowing cylindrical fragile bodiesml4,882,895, Cl. 53-531.000.
Hsien, James C. Golf club head with variable center of gravityml4,883,274, Cl. 273-164.000.
Hsu, Eric T.: *See*—
Frost, Johnathan E.; Hsu, Eric T.; Jackson, David M.; Olsen, Thomas G.; and Popp, Robert L., 4,883,549, Cl. 156-161.000.

Huang, Chente, to Amoco Corporation. Process for manufacturing polyalkenyl succinic anhydridesml4,883,886, Cl. 549-255.000.
Huang, Jan-Hong: *See—*
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Huang, Ken Y.: *See—*
Challoner, A. Dorian; von der Embse, U. A.; Mitchell, Mark P.; Chang, Donald C. D.; Fowell, Richard A.; Huang, Ken Y.; Hayden, Joseph H.; and Allen, Gene E., 4,883,244, Cl. 244-171.000.
Hubbs, Charles B.: *See—*
Weathers, John B.; Mitchell, Paul B., Jr.; Sampson, Coy L.; and Hubbs, Charles B., 4,882,818, Cl. 26-15.00R.
Huben, Aart P.: *See—*
Patron, Christian S. A. E.; Sowinski, Eugene J.; and Huben, Aart P., 4,884,043, Cl. 331-186.000.
Huber, Lothar: *See—*
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Huffer, Russell: *See—*
Nalepka, Raymond; and Huffer, Russell, 4,883,721, Cl. 428-623.000.
Huffman, Gloria M.; and Pieniak, Heinz A., to McNeil-PPC, Inc. Infant diaper with improved fitml4,883,480, Cl. 604-385.100.
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Fishkin, Theodore S.; Skidmore, Mark; and Dimitrijevic, Peter, 4,884,078, Cl. 342-360.000.
Fritzel, Bradley G., 4,883,347, Cl. 350-500.000.
Hughes, Raymond J. Tamper evident capsule and insert devicem14,883,182, Cl. 206-534.000.
Hughes, Ronald E. Process for producing a dry granular productml4,883,833, Cl. 524-394.000.
Hughes Tool Company: *See—*
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Hui, Alex C.; Wong, Anthony Y.; Dell'Oca, Conrad J.; Wong, Daniel; and Szeto, Roger, to LSI Logic Corporation. Double metal HCMOS compacted arrayml4,884,118, Cl. 357-45.000.
Hull, Ezekiel H.; and Frappier, Edward P., to Morflex Chemical Company, Inc. Process for preparing citrates using organic titanatesml4,883,905, Cl. 560-180.000.
Hull, Harold L.; and Metcalf, Donald. Golf glovem14,882,787, Cl. 2-161.00A.
Huls Aktiengesellschaft: *See—*
Smigeraki, Hans-Juergen; and Ernst, Uwe, 4,883,829, Cl. 523-334.000.
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Humphrey, Essie Mae; and Humphrey, Pete, Jr. Color coded medicine caps and labels for daily dosagem14,883,180, Cl. 206-534.000.
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Humphries, Gillian M. K.; Parce, John W.; and McConnell, Harden M., to Molecular Devices Corporation. Photoresponsive redox detection and discriminationm14,883,579, Cl. 204-403.000.
Hunkapiller, Michael W.: *See—*
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Hunter, Charles E.; and Cikanek, Harry A., to Ford Motor Company. In-cylinder control of particulates and nitric oxide for diesel enginem14,883,032, Cl. 123-276.000.
Huntsman, James R., to Minnesota Mining and Manufacturing Company. Method of describing a color in a triaxial planar vector color spacem14,884,130, Cl. 358-80.000.
Hurst, Aubrey B.: *See—*
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Miles, Peter; and Smith, Leslie A. D., 4,883,093, Cl. 138-45.000.
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Ichida, Kozaburo; Yamaguchi, Susumu; and Chikazawa, Bunichiro, to Nippon Steel Corporation. Continuous mill plant for rolling steel platesml4,882,923, Cl. 72-249.000.
Ichie, Tsugumi; and Ando, Minoru, to NGK Spark Plug Co., Ltd. Method of making terminal nut for ignition plug by plastic workingml4,882,925, Cl. 72-356.000.
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Ichiki, Tetsuji, to Yamaha Corporation. Electronic musical instrument with editing of tone dataml4,882,963, Cl. 84-1.010.
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Nelson, Richard V.; and Stephen, John F., 4,883,831, Cl. 524-100.000.
Nelson, Richard V.; and Stephen, John F., 4,883,860, Cl. 524-98.000.
Ide, Akira; and Saito, Yoshikazu, to Hitachi, Ltd. Current mirror switching circuitml4,883,988, Cl. 307-443.000.
Ide, Jun, to Alps Electric Co., Ltd. Method for restoring track 0ml4,884,152, Cl. 360-78.140.
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Iida, Noriyoshi; Uto, Nobutaka; Hiroi, Masakazu; and Hoshi, Akimitsu, to Canon Kabushiki Kaisha. Tray apparatusml4,883,265, Cl. 271-220.000.
Iijima, Satoshi: *See—*
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Ikeda Bussan Co., Ltd.: *See—*
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Ikeda, Kimihiko, to Yazaki Corporation. Combination indicator apparatus for automotive vehiclem14,884,058, Cl. 340-461.000.
Ikeda, Makoto: *See—*
Yamanouchi, Kenji; Teraoka, Yutaka; Ikeda, Makoto; Nakamura, Masao; and Kawai, Satoshi, 4,884,095, Cl. 355-1.000.
Ikeda, Tadashi: *See—*
Maruyama, Youzi; Ikeda, Tadashi; and Suzuki, Ryo, 4,884,236, Cl. 365-29.000.
Ikegami, Masaaki: *See—*
Mochizuki, Hiroshi; Tamaki, Reiji; Arima, Junichi; Ikegami, Masaaki; Tanaka, Eisuke; and Saito, Kenji, 4,884,120, Cl. 357-68.000.
Ikeuchi, Satoru; Arai, Mitutaka; Okuyama, Yuki; Yuri, Hideki; Shiohara, Tomoo; and Oyama, Yasuhiko, to Konica Corporation; and Sekisui Kagaku Kogyo Kabushiki. Toner for development of electrostatic image and method of fixing employing the samem14,883,734, Cl. 430-109.000.
Iler, Edwin A.: *See—*
Martel, Guy G.; and Iler, Edwin A., 4,883,493, Cl. 623-38.000.
Imada, Eiji: *See—*
Sugimura, Hiroshi; Imada, Eiji; Kojima, Yoshimi; and Tsuchimoto, Shuhei, 4,883,733, Cl. 430-54.000.
Imagawa, Hiroshi: *See—*
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; Tsuge, Akihiko; Imagawa, Hiroshi; Takano, Takeshi; Ueno, Fumio; Horiguchi, Akihiro; and Inoue, Hiroshi, 4,883,780, Cl. 501-96.000.
Imai, Shigeo: *See—*
Nozaki, Satoshi; Imai, Shigeo; Ishigami, Makoto; and Tomida, Katsushi, 4,883,709, Cl. 428-288.000.
Imatani, Tsuneo: *See—*
Matsuno, Kenji; Imatani, Tsuneo; Sato, Nobuyuki; Teruuchi, Osamu; and Kurashima, Hideo, 4,883,937, Cl. 219-121.640.
Imatran Voima Oy: *See—*
Kautto, Jorma, 4,882,852, Cl. 34-41.000.
Imhof, Rene : *See—*
Aschwenden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, 4,883,815, Cl. 514-541.000.
Imi-Tech Corporation: *See—*
Ferro, Gregory A., 4,883,827, Cl. 521-184.000.
Immel, Manfred, to Rittal-Werk Rudolf Loh GmbH & Co. KG. Apparatus for removing condensate water from a compressor-operated cooling devicem14,882,911, Cl. 62-288.000.
Imperial Chemical Industries PLC: *See—*
Abboud, George E.; Such, Christopher H.; Horley, Susan M.; and Waters, Julian A., 4,883,873, Cl. 544-316.000.
Clough, John M.; Godfrey, Christopher R. A.; de Fraine, Paul J.; and Snell, Brian K., 4,883,807, Cl. 514-427.000.

In-Situ, Inc.: *See*—
McKee, Charles B., Jr., 4,884,019, Cl. 324-77.00R.
Ina, Hideki; and Suzuki, Akiyoshi, to Canon Kabushiki Kaisha. Alignment method and pattern forming method using the sameml4,883,359, Cl. 356-401.000.
Inaba, Hiromi: *See*—
Ando, Takeki; Nakamura, Kiyoshi; Mine, Toshisuke; Inaba, Hiromi; Kurosawa, Toshiaki; Nakazato, Masao; and Sakai, Yoshio, 4,884,182, Cl. 363-37.000.
Inagaki, Akio: *See*—
Kobayashi, Toshimitsu; Inagaki, Akio; Kobayashi, Yasuhiro; Mori, Masanori; and Sakakibara, Takashi, 4,883,448, Cl. 474-260.000.
Inagami, Fujio, to Fujitsu Limited. Portable cordless telephone set for outputting various discriminiation sounds with simple circuit constructionml4,884,294, Cl. 379-61.000.
Inaki, Shunichi: *See*—
Ishida, Mamoru; Inaki, Shunichi; Akiyama, Yoshikazu; and Kohata, Mitsuhiro, 4,883,766, Cl. 437-40.000.
Inbar, Michael: *See*—
Tamir, Ilana; Kidron, Ben-Zion; Wang, Lynn; and Inbar, Michael, 4,883,765, Cl. 436-71.000.
Ince, Francis; Springthorpe, Brian; and Dixon, John, to Fisons plc. Aromatic compoundsml4,883,804, Cl. 514-357.000.
Industrial Technology Research Institute: *See*—
Hsieh, Min-Lang; Huang, Jan-Hong; Jan, Lian; and Guan, Gang-Shyr, 4,882,895, Cl. 53-531.000.
Ingle, Lloyd D.; Allen, Henry V.; and Knutti, James W., to Hybond, Inc. Dynamic force measurement systemml4,884,223, Cl. 364-550.000.
Inoue, Hideo: *See*—
Sugitani, Tatsuo; Uchida, Kiyoyuki; and Inoue, Hideo, 4,883,326, Cl. 303-110.000.
Inoue, Hiroshi; Omata, Satoshi; Osada, Yoshiyuki; Inoue, Yutaka; Yamakawa, Tadashi; and Satomura, Hiroshi, to Canon Kabushiki Kaisha. Image forming apparatus and driving method thereforml4,884,079, Cl. 346-1.100.
Inoue, Hiroshi: *See*—
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; Tsuge, Akihiko; Imagawa, Hiroshi; Takano, Takeshi; Ueno, Fumio; Horiguchi, Akihiro; and Inoue, Hiroshi, 4,883,780, Cl. 501-96.000.
Inoue, Manabu; Taniguchi, Nobuyuki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Photographic cameraml4,884,092, Cl. 354-289.100.
Inoue, Manabu: *See*—
Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 4,884,089, Cl. 354-222.000.
Inoue, Masahiro: *See*—
Menjo, Takeshi; Inoue, Masahiro; and Amemiya, Koji, 4,883,019, Cl. 118-691.000.
Inoue, Satoru: *See*—
Ozaki, Sei; Inoue, Satoru; and Futamura, Shoji, 4,883,420, Cl. 425-464.000.
Inoue, Takeo, to Fuji Jukogyo Kabushiki Kaisha. Differential for a motor vehicleml4,882,949, Cl. 74-714.000.
Inoue, Yutaka: *See*—
Inoue, Hiroshi; Omata, Satoshi; Osada, Yoshiyuki; Inoue, Yutaka; Yamakawa, Tadashi; and Satomura, Hiroshi, 4,884,079, Cl. 346-1.100.
Integrated Solar Technologies Corp.: *See*—
Hagerty, James J.; and Danziger, Leslie A., 4,883,522, Cl. 65-18.400.
Intelmatec Corporation: *See*—
Akagawa, Minoru, 4,883,300, Cl. 294-2.000.
Interface Biomedical Laboratories Corp.: *See*—
Sawyer, Philip N., 4,883,461, Cl. 604-53.000.
Intergraph Corporation: *See*—
Sachs, Howard G.; Cho, James Y.; and Hollingsworth, Walter H., 4,884,197, Cl. 364-200.000.
Interlego A.G.: *See*—
Bolli, Peter, 4,883,440, Cl. 446-91.000.
International Business Machines Corporation: *See*—
Agnew, Palmer W.; Clayton, Neil H.; Judkovics, Monroe; Rivero, Jose L.; and Sun, Kuo-chang, 4,884,218, Cl. 364-513.000.
Chevion, Dan S.; Karnin, Ehud D.; and Walach, Eugeniusz, 4,884,131, Cl. 358-88.000.
Concha, Fernando; and Stancil, Charles J., 4,884,271, Cl. 371-40.200.
Feilchenfeld, Natalie B.; Fuerniss, Stephen J.; Glenning, John J.; Pawlowski, Walter P.; Phelan, Giana M.; and Rickerl, Paul G., 4,883,744, Cl. 430-325.000.
Mueller, Wolfgang R.; and Spencer, Gwynne W., II, 4,884,237, Cl. 365-63.000.
Ngai, Chuck H.; and Watkins, Gerald J., 4,884,190, Cl. 364-200.000.
International Business Macines Corporation: *See*—
Boothroyd, William A.; Camann, James C.; and Palo, Robert A., 4,884,199, Cl. 364-408.000.
International Flavors & Fragrances Inc.: *See*—
Boden, Richard M.; and McGhie, Joseph A., 4,883,884, Cl. 549-74.000.
Byrne, Brian, 4,883,680, Cl. 426-534.000.
Intersciences Development Associates, Inc.: *See*—
Widdoes, Harold D.; Katz, Solomon H.; and Cronk, Christine E., 4,883,066, Cl. 128-774.000.
Iowa State University Research Foundation, Inc.: *See*—
Nissen, Steven L., 4,883,817, Cl. 514-557.000.
Irigoyen, Pierre, to Decoufle s.a.r.l. Apparatus for transporting and treating particles of tobacco and the likeml4,883,077, Cl. 131-108.000.
Isenstein, Louise M.: *See*—
Fogarty, Kevin E.; Fay, Fredric S.; Isenstein, Louise M.; and Coggins, James M., 4,884,225, Cl. 364-559.000.
Ishibashi, Takanobu: *See*—
Abe, Tomiya; Shimazaki, Yukio; Ishibashi, Takanobu; Abe, Norimoto; Asai, Takayasu; and Taketani, Noriaki, 4,883,338, Cl. 350-96.340.
Ishida, Mamoru; Inaki, Shunichi; Akiyama, Yoshikazu; and Kohata, Mitsuhiro, to Ricoh Company, Ltd.; and Ricoh Research Institute of General Electronics. Method of producing thin film transistorml4,883,766, Cl. 437-40.000.
Ishida, Toshinobu: *See*—
Kousai, Tadashi; Ishida, Toshinobu; and Moriuchi, Yousuke, 4,883,468, Cl. 604-164.000.
Ishida, Yoshihiro; Yoshida, Akira; and Kobayashi, Hideo, to Texas Instruments Incorporated. Method of ionizing gas within cathode-containing chamberml4,883,969, Cl. 250-427.000.
Ishidate, Takeo: *See*—
Kimura, Haruo; Ishidate, Takeo; and Goto, Masao, 4,883,183, Cl. 209-534.000.
Ishigami, Makoto: *See*—
Nozaki, Satoshi; Imai, Shigeo; Ishigami, Makoto; and Tomida, Katsushi, 4,883,709, Cl. 428-288.000.
Ishihara, Shin-ichiro, to Matsushita Electric Industrial Co., Ltd. Plasma treating apparatus for gas temperature measuring methodml4,883,560, Cl. 156-626.000.
Ishihara, Toshinobu: *See*—
Endo, Mikio; Takamizawa, Minoru; Ishihara, Toshinobu; Kubota, Tohru; and Shinohara, Toshio, 4,883,569, Cl. 204-157.740.
Ishii, Keizou: *See*—
Muramoto, Hisaichi; Ishii, Keizou; and Miyazono, Tadafumi, 4,883,899, Cl. 560-14.000.
Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, to Hitachi, Ltd. & Hitachi Iruma Electronic Corp., Ltd. Method of assembling a light emitting device with an optical fiberml4,883,342, Cl. 350-320.000.
Ishii, Tatsuya, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor devicesml4,884,121, Cl. 357-68.000.
Ishikawa, Osamu; Sone, Mikihiko; and Suzuki, Yoshimi, to Oki Electric Industry Co., Ltd. Circuit employing a plurality of counters and an interpolator for converting a video signal into a binary signalml4,884,148, Cl. 358-464.000.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See*—
Matsui, Kunio; Fukase, Hisahiko; Hirata, Atsushi; and Nomura, Akihiro, 4,883,113, Cl. 164-428.000.
Ishikura, Takuro, to Sharp Kabushiki Kaisha. Method of producing magnetosensitive semiconductor devicesml4,883,773, Cl. 437-207.000.
Ishioka, Sachio: *See*—
Makishima, Tatsuo; Hirai, Tadaaki; Tsuji, Kazutaka; Ishioka, Sachio; Yamashita, Takashi; Shidara, Keiichi; Yamazaki, Junichi; and Aiba, Masaaki, 4,884,011, Cl. 315-368.000.
Ishitobi, Ken: *See*—
Miyazaki, Kunihiro; and Ishitobi, Ken, 4,883,502, Cl. 51-309.000.
Ishiyama, Nobuo: *See*—
Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, 4,883,879, Cl. 546-280.000.
Ishizeki, Seiichi, to Fuji Jukogyo Kabushiki Kaisha. System for displaying trouble in an electronic control system of a motor vehicleml4,884,056, Cl. 340-453.000.
Ishizuka, Akira; and Nakamura, Toshihiko, to NEC Corporation. Fast summing circuitml4,884,233, Cl. 364-786.000.
Isida, Takeshi: *See*—
Kobayashi, Osamu; Furuya, Yonezou; Isida, Takeshi; and Mikami, Mitsugu, 4,883,158, Cl. 194-217.000.
Isnardi, Michael A.; and Hurst, Robert N., Jr., to General Electric Company. Apparatus for pre-conditioning auxiliary television signal informationml4,884,127, Cl. 358-12.000.
Isobe, Eiji: *See*—
Suga, Yoshinori; Tanaka, Eiji; Maruyama, Yasuo; and Isobe, Eiji, 4,883,848, Cl. 526-124.000.
Isuzu Motors Limited: *See*—
Kawamura, Hideo, 4,882,905, Cl. 60-608.000.
Sekiyama, Shigeo; and Okada, Masaki, 4,882,906, Cl. 60-624.000.
Ito, Masami: *See*—
Matsui, Takayuki; Okuyama, Toshiaki; Matsutake, Mitsugu; Takahashi, Junichi; and Ito, Masami, 4,884,184, Cl. 363-46.000.
Ito, Masayoshi: *See*—
Sakamoto, Tatsurou; Ito, Masayoshi; and Yamano, Yoshinori, 4,883,439, Cl. 445-66.000.
Ito, Ryoichi; Iwai, Koji; Nishida, Tsuyoshi; and Kimura, Junji, to Kubota Limited. Water-cooling system for a water-cooled horizontal cylinder engineml4,883,024, Cl. 123-41.700.
Ito, Takahiko: *See*—
Yoshikawa, Eiichi; Shinozaki, Takashi; and Ito, Takahiko, 4,883,264, Cl. 271-110.000.
Ito, Toshikazu; Suemune, Toshiro; and Sato, Katsuhiko, to Oki Electric Industry Co., Ltd. Method and apparatus for preventing the overheat of a line feed motor for a printerml4,884,162, Cl. 361-23.000.
Ito, Yoshikuni: *See*—
Hashimoto, Masashi; Oku, Teruo; Ito, Yoshikuni; Namiki, Takayuki; Sawada, Kozo; Kasahara, Chiyoshi; and Baba, Yukihisa, 4,883,800, Cl. 514-259.000.

Itoh, Hiromi: *See*—
Kasai, Kazumi; Itoh, Hiromi; Tanaka, Hitoshi; Oh-hori, Tatsuya; and Komeno, Junji, 4,883,020, Cl. 118-719.000.
Itoh, Hiroshi, to Toshiba Machine Co., Ltd. Position control methodml4,884,014, Cl. 318-600.000.
Itoh, Kazuhiro: *See*—
Tanahashi, Toshio; Kanamaru, Masanobu; Itoh, Toshio; and Itoh, Kazuhiro, 4,883,030, Cl. 123-193.0CH.
Itoh, Teruyoshi: *See*—
Hosoe, Katsuharu; Itoh, Teruyoshi; Tachi, Ryosuke; and Nojiri, Takao, 4,883,033, Cl. 123-335.000.
Itoh, Toshio: *See*—
Tanahashi, Toshio; Kanamaru, Masanobu; Itoh, Toshio; and Itoh, Kazuhiro, 4,883,030, Cl. 123-193.0CH.
Iwado, Shuichi: *See*—
Kuwamoto, Hiroshi; Iwado, Shuichi; Koga, Yoichi; Izushi, Tomoya; Muto, Toshimi; and Kuroi, Nobuomi, 4,883,606, Cl. 252-32.500.
Iwai, Koji: *See*—
Ito, Ryoichi; Iwai, Koji; Nishida, Tsuyoshi; and Kimura, Junji, 4,883,024, Cl. 123-41.700.
Iwamoto, Kohei: *See*—
Fukushima, Hitoshi; Takei, Katsumori; Iwamoto, Kohei; and Nakamura, Hiroto, 4,884,081, Cl. 346-74.600.
Iwanaga, Yukiya: *See*—
Sano, Hiroyuki; Kizaki, Masatoshi; and Iwanaga, Yukiya, 4,883,683, Cl. 426-582.000.
Iwanami, Teruo; Moriyama, Takamasa; and Asano, Kuniyoshi, to Nippon Gohsei Kaguku Kogyo Kabushikis Kaisha. Laminateml4,883,696, Cl. 428-35.400.
Iwase, Morikazu: *See*—
Sonoda, Takakuni; Tanabe, Kazunori; Iwase, Morikazu; Sangyoji, Kazuo; and Kato, Tokunori, 4,884,082, Cl. 346-105.000.
Iwase, Takayuki; Sakanobe, Minoru; and Koga, Yuji, to Brother Kogyo Kabushiki Kaisha. Data processing apparatus with CRT and printerml4,883,376, Cl. 400-83.000.
Iwata, Yuzo; Makiuchi, Hajime; and Kitajima, Masao, to Fuji Photo Film Co., Ltd. Method for quantitative analysis of analyte in liquid sample using analytical elementml4,884,213, Cl. 364-497.000.
Izumi, Kouji: *See*—
Takahashi, Junichi; Kosaka, Daisuke; Eguchi, Hirotoshi; Matsumoto, Shoji; Akahori, Takashi; Yamazaki, Hiroshi; and Izumi, Kouji, 4,884,051, Cl. 338-4.000.
Izumi, Yoshinori: *See*—
Ninomiya, Yuichi; Ohtsuka, Yoshimichi; Izumi, Yoshinori; Gohshi, Seiichi; and Shishikui, Yoshiaki, 4,884,136, Cl. 358-105.000.
Izumida, Satoshi; and Kitamura, Katsumi, to Ikeda Bussan Co., Ltd. Seat structureml4,883,320, Cl. 297-452.000.
Izushi, Tomoya: *See*—
Kuwamoto, Hiroshi; Iwado, Shuichi; Koga, Yoichi; Izushi, Tomoya; Muto, Toshimi; and Kuroi, Nobuomi, 4,883,606, Cl. 252-32.500.
J. E. Hanger & Company Limited: *See*—
Cooper, John E., 4,883,494, Cl. 603-39.000.
J. M. Huber Corporation: *See*—
Kosin, John A.; Preston, Barry W.; and Wallace, David N., 4,883,533, Cl. 106-18.140.
J.M. Voith GmbH: *See*—
Loser, Hans; Chau-Huu, Tri; and Meinecke, Albrecht, 4,882,855, Cl. 34-116.000.
J. R. Simplot Co.: *See*—
Bierman, Laurence W.; Polinsky, Samuel M.; and Humberger, Roger B., 4,883,586, Cl. 209-167.000.
Jabil Circuit Company: *See*—
Zboralski, James A.; Hock, Darryl A.; and Kaleita, David L., 4,884,215, Cl. 364-510.000.
Jacko, Michael: *See*—
Tsang, Peter; Rhee, Seong; Jacko, Michael; and Kubik, James, 4,883,023, Cl. 123-25.00A.
Jackson, David M.: *See*—
Frost, Johnathan E.; Hsu, Eric T.; Jackson, David M.; Olsen, Thomas G.; and Popp, Robert L., 4,883,549, Cl. 156-161.000.
Jackson, Edward; and Pasqualucci, Joseph, to Sherwood Medical Company. Motor unit for a fluid pump and method of operationml4,884,013, Cl. 318-481.000.
Jackson, Jared K.: *See*—
Nagy, Gabor S.; Akeson, Richard C.; Sweenie, Richard E.; Novak, Mark E.; Malsch, Harry K.; Widule, Thomas J.; Ding, Gustav L. P.; and Jackson, Jared K., 4,882,930, Cl. 73-56.000.
Jacobs, Michael F.: *See*—
Hill, Lawrence A.; Jacobs, Michael F.; Kroll, Arthur S.; and Williams, Ralph E., 4,884,109, Cl. 355-260.000.
Jacoby, John E.; Yu, Ho; and Ramser, Robert A., to Aluminum Company of America. Method of producing aircraft plate and sheetml4,882,831, Cl. 29-527.500.
Jacquier, Paul, to Framatome. Heating apparatus, particularly for the heat treatment of a tube of small diameter and of curved shapeml4,883,946, Cl. 219-523.000.
Jaeckel, Lothar; Kleber, Rolf; and Mees, Bernhard, to Hoechst Aktiengesellschaft. Amino-containing alkenylsuccinic estersml4,883,495, Cl. 8-115.600.
Jaggli, Stephan: *See*—
Bernhard, Kurt; Jaggli, Stephan; Kreienbuhl, Paul; and Schwieter, Ulrich, 4,883,887, Cl. 549-341.000.
Jakfalvi, Elemer: *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Szirt nee Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Jakfalvi, Elemer; Zukovics nee Sumeg, Katalin; Gado, Klara; and Hegedus, Maria, 4,883,798, Cl. 514-256.000.
Jakob-Roetne, Roland: *See*—
Aschwenden, Werner; Imhof, Rene ; Jakob-Roetne, Roland; and Kyburz, Emilio, 4,883,815, Cl. 514-541.000.
James River Corporation: *See*—
Maynard, Patrick L.; Schmelzer, Michael A.; and Pawlowski, Thomas D., 4,883,936, Cl. 219-10.55F.
Newkirk, David D., 4,883,707, Cl. 428-219.000.
Jan, Lian: *See*—
Hsieh, Min-Lang; Huang, Jan-Hong; Jan, Lian; and Guan, Gang-Shyr, 4,882,895, Cl. 53-531.000.
Janiel, Peter A.: *See*—
Gartner, Georg F.; Rau, Hans; and Janiel, Peter A., 4,883,362, Cl. 366-101.000.
Janocha, Siegfried: *See*—
Bothe, Lothar; Crass, Guenther; Janocha, Siegfried; and Schloegl, Gunter, 4,883,698, Cl. 428-35.900.
Jansa, Bruno: *See*—
Becker, Reinhard; and Jansa, Bruno, 4,883,242, Cl. 244-118.500.
Japan Atomic Power Company, The: *See*—
Fujitani, Takashi; Uemura, Hiromi; Kishimoto, Toshiaki; Uchiyama, Masayuki; Shirasu, Isao; Kurokawa, Hideyuki; Nishioka, Takashi; Kikukawa, Kenji; and Sato, Yoshinori, 4,883,185, Cl. 212-147.000.
Japan Aviation Electronics Industry Limited: *See*—
Okada, Kenichi, 4,883,358, Cl. 356-350.000.
Suzuki, Takao; and Uekido, Kouzou, 4,883,429, Cl. 439-74.000.
Japan Electronic Control Systems Co., Ltd.: *See*—
Nakaniwa, Shinpei, 4,883,038, Cl. 123-436.000.
Japan Steel Works, Ltd., The: *See*—
Fujitani, Takashi; Uemura, Hiromi; Kishimoto, Toshiaki; Uchiyama, Masayuki; Shirasu, Isao; Kurokawa, Hideyuki; Nishioka, Takashi; Kikukawa, Kenji; and Sato, Yoshinori, 4,883,185, Cl. 212-147.000.
Japan Tobacco Inc.: *See*—
Hirose, Ichiro; Sagawa, Takayoshi; Tani, Shichisei; and Kato, Katsuo, 4,883,078, Cl. 131-280.000.
Japuntich, Daniel A., to Minnesota Mining and Manufacturing Company. Method of forming a high efficiency respiratorml4,883,547, Cl. 156-73.400.
Jarolimek, Zdenek: *See*—
Burysek, Frantisek; Jirka, Bohuslav; Jarolimek, Zdenek; and Fajt, Ludvik, 4,883,231, Cl. 242-35.50A.
Jarrell, Bruce E.: *See*—
Carabasi, R. Anthony; Jarrell, Bruce E.; and Williams, Stuart K., 4,883,755, Cl. 435-240.200.
Jason, Inc.: *See*—
Warner, R. Brown; and Scheider, Alfred F., 4,882,879, Cl. 51-337.000.
Jasper, Edward P.; and Truckenbrod, Thomas G., to HCC, Inc. Harvester reel tine and bat assemblyml4,882,899, Cl. 56-220.000.
Jennings, Alfred R., Jr., to Mobil Oil Corporation. Method of enhancing hydrocarbon production in a horizontal wellbore in a carbonate formationml4,883,124, Cl. 166-307.000.
Jensen, David G., to Boenig Company, The. Method and apparatus for determining infrared signature of objectsml4,883,971, Cl. 250-495.100.
Jervis B. Webb Company: *See*—
Kavieff, Shelden M., 4,883,401, Cl. 414-273.000.
Jex Co., Ltd.: *See*—
Morifuki, Yaso, 4,883,464, Cl. 604-74.000.
Jiang, William Y.: *See*—
Kong, Samuel K.; Jiang, William Y.; and Chan, Wallace C. W., 4,884,165, Cl. 361-98.000.
Jidosha Kiki Co., Ltd.: *See*—
Arino, Masao; and Takase, Jinki, 4,882,980, Cl. 92-48.000.
Shimamura, Morihiko; Satoh, Satoru; and Kobayashi, Michio, 4,882,975, Cl. 91-376.00R.
Jinnai, Shigeru; and Sakai, Shinji, to Canon Kabushiki Kaisha. Electronic cameraml4,884,144, Cl. 358-228.000.
Jirka, Bohuslav: *See*—
Burysek, Frantisek; Jirka, Bohuslav; Jarolimek, Zdenek; and Fajt, Ludvik, 4,883,231, Cl. 242-35.50A.
Johanson, Niles W.; Saeger, James C.; and White, Mark L., to Ogden Environmental Services, Inc. Method and apparatus for cooling high-temperature processesml4,883,115, Cl. 165-1.000.
John Fluke Mfg. Co. Inc.: *See*—
Cok, Steven P.; and Lewandowski, Robert J., 4,884,035, Cl. 328-133.000.
Johnson Electric Industrial Manufactory, Limited: *See*—
Lau, James C., 4,883,998, Cl. 310-239.000.
Johnson, Neil R.: *See*—
Deakins, Martin E.; Slutz, David E.; Johnson, Neil R.; Clark, Thomas J.; and Bovenkerk, Harold P., 4,883,500, Cl. 51-298.000.
Johnston, Alan R.; Nixon, Robert H.; Bergman, Larry A.; and Esener, Sadik, to California Institute of Technology. Multi-port, optically addressed RAMml4,884,243, Cl. 365-234.000.
Johnston, Darlene D.: *See*—
Brown, James R.; McIntyre, Norman S.; and Johnston, Darlene D., 4,883,782, Cl. 502-220.000.
Joint Medical Products Corporation: *See*—
Mallory, Thomas H.; McTighe, Timothy; and Noiles, Douglas G., 4,883,491, Cl. 623-22.000.

Jones, Gerald M.; and Nemcovsky, Rhonda L., to GTE Products Corporation. Component removal methodml4,882,838, Cl. 29-829.000.

Jones, Gordon R. Optical birefringment parameter measuring sensorml4,883,952, Cl. 250-225.000.

Jones, Robert E. Knitting machine stop motion activatorml4,882,916, Cl. 66-163.000.

Jones, Ronald; and Amy, Michael E., to NCR Corporation. Converter device for interconnecting systems having different communication standardsml4,884,287, Cl. 375-121.000.

Jordan Enterprises: *See*—
Strong, Bernard, 4,883,101, Cl. 141-27.000.

Jorg, Gunther W. End plate for a ram-wing boatml4,883,015, Cl. 114-272.000.

Joseph, Brian J.; Procter, Leo G.; and Roy, Carl W., to Eastman Kodak Co. Reproduction apparatus having a sprocket-driven transfer drumml4,884,105, Cl. 355-212.000.

Joss, Bernard: *See*—
Teodor˙iis, Viron; and Joss, Bernard, 4,884,252, Cl. 368-10.000.

Jowitt, Frederick W.; Harrison, Robert H.; and Noke, Adrian C., to Metal Box plc. Electro-coating apparatus and methodml4,883,578, Cl. 204-300.0EC.

Jude, Daniel; and Stull, James T., to Dujardin Montbard Somenor. Roll mounting device with a cooled bearingml4,883,369, Cl. 384-476.000.

Judkovics, Monroe: *See*—
Agnew, Palmer W.; Clayton, Neil H.; Judkovics, Monroe; Rivero, Jose L.; and Sun, Kuo-chang, 4,884,218, Cl. 364-513.000.

Jugle, Don B.: *See*—
Hoffend, Thomas R.; and Jugle, Don B., 4,883,736, Cl. 430-110.000.

Juki Corporation: *See*—
Hiramatsu, Tohru, 4,883,008, Cl. 112-262.100.

Julius Blum Gesellschaft M.B.H.: *See*—
Rock, Erich; Rupprechter, Helmut; and Brustle, Klaus, 4,882,808, Cl. 16-240.000.

Jung, Johann: *See*—
Von Maessenhausen, Walter; Czikkely, Vilmos; and Jung, Johann, 4,883,530, Cl. 71-36.000.

Jung, Werner; and Sievers, Axel, to BASF Lacke & Farben AG. Soluble acrylate copolymer containing carboxyl groups, processes for its preparation and coating agents based on the acrylate copolymerml4,883,838, Cl. 525-119.000.

Juridical Foundation the Chemo-Sero-Therapeutic Research Institute: *See*—
Eda, Yasuyuki; Maeda, Toshihiro; Nishiyama, Kiyoto; and Tashiro, Akira, 4,883,752, Cl. 435-68.000.

Jurkevics, Andrejs: *See*—
Hadidi, Mohamed T.; Jurkevics, Andrejs; and Linville, Andrew F., Jr., 4,884,247, Cl. 367-43.000.

JVJ Enterprises, Inc.: *See*—
Lansing, James P., 4,883,508, Cl. 55-322.000.

JWI, Incorporated: *See*—
McIntosh, George C.; and Gowin, Robert, 4,884,245, Cl. 366-279.000.

Kabe, Kazuyuki: *See*—
Takahashi, Ken; and Kabe, Kazuyuki, 4,883,108, Cl. 152-531.000.

Kabel-und Metallwerke G. AG: *See*—
Gravemann, Horst, 4,883,112, Cl. 164-459.000.

Kabmatik AB: *See*—
Lindstrom, Lennart, 4,883,230, Cl. 242-25.00R.

Kabushiki Kaisha I.S.T.: *See*—
Kuge, Tsukasa; Goto, Masahiro; and Sakane, Isamu, 4,883,715, Cl. 428-421.000.

Kabushiki Kaisha Kenwood: *See*—
Miyamoto, Yukihiko; Kobayashi, Hirokazu; and Suzuki, Syoichi, 4,884,267, Cl. 370-100.100.
Nakayama, Shigeyuki, 4,884,284, Cl. 375-1.000.

Kabushiki Kaisha Meidensha: *See*—
Ogawa, Hiroshi; and Yoshida, Susumu, 4,884,202, Cl. 364-424.010.

Kabushiki Kaisha Nippon Coinco: *See*—
Kobayashi, Osamu; Furuya, Yonezou; Isida, Takeshi; and Mikami, Mitsugu, 4,883,158, Cl. 194-217.000.

Kabushiki Kaisha Toshiba: *See*—
Azukizawa, Teruo; Morishita, Mimpei; Yokoyama, Toyohiko; Takaki, Shigeo; Yuyama, Yoshio; and Noda, Akitaka, 4,882,999, Cl. 104-281.000.
Futamata, Shinichiro, 4,883,960, Cl. 250-327.200.
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; Kanai, Tsutomu; and Matsui, Toshikazu, 4,884,080, Cl. 346-46.000.
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; Tsuge, Akihiko; Imagawa, Hiroshi; Takano, Takeshi; Ueno, Fumio; Horiguchi, Akihiro; and Inoue, Hiroshi, 4,883,780, Cl. 501-96.000.
Kinoshita, Osamu, 4,884,280, Cl. 372-38.000.
Koyama, Katsuhiko, 4,884,293, Cl. 378-197.000.
Koyama, Mikio; and Tanimoto, Hiroshi, 4,884,036, Cl. 328-167.000.
Morimoto, Toshiki; and Watanabe, Seiji, 4,883 980, Cl. 307-465.100.
Muramoto, Ken'ichi, 4,884,113, Cl. 357-23.400.
Nishimura, Hiroshi; and Tanaka, Satoshi, 4,883,529, Cl. 65-281.000.
Ohshima, Shigeo; and Sahara, Hiroshi, 4,883,978, Cl. 307-443.000.
Sato, Hideki; Mizunoya, Nobuyuki; Asai, Hironori; Anzai, Kazuo; and Hatano, Tsuyoshi, 4,883,704, Cl. 428-209.000.
Shirai, Koji, 4,884,116, Cl. 357-41.000.
Suzuki, Nobuo, 4,884,142, Cl. 358-213.190.
Tanaka, Sumio; Atsumi, Shigeru; and Saito, Shinji, 4,884,241, Cl. 365-210.000.
Thiel, Geoffrey L.; Hodgkiss, Douglas H.; and Tohara, Hisanori, 4,884,196, Cl. 364-200.000.
Uya, Shinji, 4,884,143, Cl. 358-213.280.
Watanabe, Junji, 4,884,107, Cl. 355-218.000.

Kabushiki Kaisha Yaskawa Denki Seisakusho: *See*—
Kimura, Kaoru; Nishi, Masanori; and Minami, Yoshikatsu, 4,884,189, Cl. 364-474.310.

Kabushiki Kaisya Advance: *See*—
Ohta, Midori, 4,883,668, Cl. 424-448.000.

Kainer, Hartmut; Grimm, Daniel; Schnelle, Wilfried; and Halbach, Peter, to Didier-Werke AG. Use of manganese nodules or deep-sea ores containing manganese for the reduction of nitrogen oxides in exhaust gasesml4,883,647, Cl. 423-239.000.

Kainz, Alois: *See*—
Seibt, Artur; and Kainz, Alois, 4,884,204, Cl. 364-431.030.

Kajima Corporation: *See*—
Yano, Kenichi; Midorikawa, Hiroshi; Kamei, Toshiaki; and Shizume, Takeharu, 4,883,250, Cl. 248-638.000.

Kajiwara, Akiharu: *See*—
Nakamoto, Kouji; Suzuki, Takeshi; Abe, Shinya; Hayashi, Kenji; Kajiwara, Akiharu; Yamatsu, Isao; Otsuka, Issei; and Shiojiri, Hiroyuki, 4,883,916, Cl. 564-186.000.

Kaken Pharmaceutical Co., Ltd.: *See*—
Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, 4,883,879, Cl. 546-280.000.

Kakinuma, Kazuo: *See*—
Yamamoto, Shosaku; Kakinuma, Kazuo; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, 4,883,834, Cl. 524-504.000.

Kakita, Akira: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,883,452, Cl. 600-36.000.

Kaleita, David L.: *See*—
Zboralski, James A.; Hock, Darryl A.; and Kaleita, David L., 4,884,215, Cl. 364-510.000.

Kaler, Mark K., to Dayton Superior Corporation. Load transfer assemblyml4,883,385, Cl. 404-47.000.

Kali-Chemie Aktiengesellschaft: *See*—
Boedecker, Manfred; Benecke, Thomas; Krucke, Werner; and Baumeister, Willi, 4,883,913, Cl. 564-2.000.

Kalka, Donald M. Ski sharpenerml4,882,953, Cl. 76-83.000.

Kameda, Osamu; and Yamasaki, Hirokazu, to Mazda Motor Corporation. Four-wheel drive vehicle operating systemml4,883,138, Cl. 180-249.000.

Kamei, Hideo; Ohbayashi, Masaru; Tomita, Koji; Sugawara, Koko; and Konishi, Masataka, to Bristol-Myers Company. Biologically pure culture of the microorganism *Streptomycas tropolofaciens* used for producing 3,7-dihydroxytropolone and antitumor useml4,883,758, Cl. 435-253.500.

Kamei, Toshiaki: *See*—
Yano, Kenichi; Midorikawa, Hiroshi; Kamei, Toshiaki; and Shizume, Takeharu, 4,883,250, Cl. 248-638.000.

Kameyama, Makoto: *See*—
Miyakawa, Hideaki; and Kameyama, Makoto, 4,884,156, Cl. 360-121.000.

Kampfer, Helmut; and Himmelmann, Wolfgang, to AGFA-Gevaert Aktiengessellschaft. Process for the preparation of sulfoalkyl quaternary salts and for the production of alkane sultonesml4,883,880, Cl. 546-347.000.

Kanai, Tsutomu: *See*—
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; Kanai, Tsutomu; and Matsui, Toshikazu, 4,884,080, Cl. 346-46.000.

Kanamaru, Masanobu: *See*—
Tanahashi, Toshio; Kanamaru, Masanobu; Itoh, Toshio; and Itoh, Kazuhiro, 4,883,030, Cl. 123-193.0CH.

Kanda, Masao, to Pioneer Electronic Corporation. Information reproducerml4,884,150, Cl. 358-327.000.

Kanda, Ryouji, to Tokai Rubber Industries, Ltd. Elastic bushing having fluid chamber filled with highly viscous fluidml4,883,260, Cl. 267-140.100.

Kanda, Takeshi: *See*—
Yasuno, Hiroshi; Sakatani, Fumio; and Kanda, Takeshi, 4,883,575, Cl. 204-198.000.

Kaneko, Isao, to Sankyo Company Limited. Human complement factors and their therapeutic useml4,883,784, Cl. 514-8.000.

Kaneko, Tomoyuki: *See*—
Kato, Eiji; Kuboshima, Katsumi; and Kaneko, Tomoyuki, 4,883,196, Cl. 220-415.000.

Kaneko, Yukihiro: *See*—
Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 4,883,596, Cl. 210-638.000.

Kang, Shinhoo: *See*—
Dunn, Edmund M.; Kang, Shinhoo; and Wei, George C., 4,883,217, Cl. 228-122.000.
Dunn, Edmund M.; Kang, Shinhoo; and Wei, George C., 4,883,218, Cl. 228-122.000.

Kanno, Masahide; Yabe, Hisao; Yokoi, Takeshi; Yoshinaga, Jun; and Ohzeki, Kazuhiko, to Olympus Optical Co., Ltd. Endoscope light source apparatusml4,884,133, Cl. 358-98.000.

Kansai Electric Power Co., Inc., The: *See*—
Fujitani, Takashi; Uemura, Hiromi; Kishimoto, Toshiaki; Uchiyama, Masayuki; Shirasu, Isao; Kurokawa, Hideyuki; Nishi-

oka, Takashi; Kikukawa, Kenji; and Sato, Yoshinori, 4,883,185, Cl. 212-147.000.

Kansai Paint Co., Ltd.: *See*—
Kitabatake, Michiharu; and Tominaga, Akira, 4,883,830, Cl. 523-414.000.
Kondo, Toshio; and Kinaga, Yoshimasa, 4,883,571, Cl. 204-180.600.

Kanzaki Kokyukoki Mfg. Co. Ltd.: *See*—
Yamaoka, Kojiro; Azuma, Toshiro; Fujisaki, Koichiro; and Okada, Hideaki, 4,882,940, Cl. 74-15.66l.

Kapadia, Indu; and Schankereli, Kemal. Prosthetic ligamentml4,883,486, Cl. 623-13.000.

Kaplan, Ida B., to MTR Enterprises. Pregnant mother doll and separable baby dollml4,883,442, Cl. 446-320.000.

Kariya, Kenichi; Noda, Masayuki; Yamaguchi, Takahiro; and Takahashi, Katsuji, to Shin-Kobe Electric Machinery Co., Ltd. Metal foil covered laminateml4,883,708, Cl. 428-263.000.

Karnin, Ehud D.: *See*—
Chevion, Dan S.; Karnin, Ehud D.; and Walach, Eugeniusz, 4,884,131, Cl. 358-88.000.

Karube, Yoshiyuki; and Kawahara, Yuji, to Brother Kogyo Kabushiki Kaisha. Printing deviceml4,883,375, Cl. 400-55.000.

Kasahara, Chiyoshi: *See*—
Hashimoto, Masashi; Oku, Teruo; Ito, Yoshikuni; Namiki, Takayuki; Sawada, Kozo; Kasahara, Chiyoshi; and Baba, Yukihisa, 4,883,800, Cl. 514-259.000.

Kasai, Kazumi; Itoh, Hiromi; Tanaka, Hitoshi; Oh-hori, Tatsuya; and Komeno, Junji, to Fujitsu Limited. Apparatus of metal organic chemical vapor deposition for growing epitaxial layer of compound semiconductorml4,883,020, Cl. 118-719.000.

Kasai, Motoko, personal representative: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,883,452, Cl. 600-36.000.

Kasai, Yoichi, deceased (by Kasai, Motoko, personal representative); Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, to Hoxan Corporation. Method of fabricating frozen fine liver pieces for artificial liver, apparatus for freezing the same, and freezing vesselml4,883,452, Cl. 600-36.000.

Kasamatsu, Kiyoto: *See*—
Samejima, Kazuo; Tsuchihashi, Hironori; Sato, Tsuyoshi; Hamada, Toshihiko; Kida, Hideo; and Kasamatsu, Kiyoto, 4,882,898, Cl. 56-208.000.

Kasan, Rodney; Yellin, Haim; and Seiffe, Michael, to Teva Pharmaceutical Industries Ltd. Stable, Injectable solutions of vinca dimer saltsml4,883,805, Cl. 514-411.000.

Kashihara, Yuji; Taga, Yutaka; and Kubo, Seitoku, to Toyota Jidosha Kabushiki Kaisha. Hydraulic control system for automatic transmission with shifting shock reducing meansml4,882,952, Cl. 74-867.000.

Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; Tsuge, Akihiko; Imagawa, Hiroshi; Takano, Takeshi; Ueno, Fumio; Horiguchi, Akihiro; and Inoue, Hiroshi, to Kabushiki Kaisha toshiba. Aluminum nitride sintered body and preparation thereofml4,883,780, Cl. 501-96.000.

Katagiri, Kazuharu: *See*—
Okada, Shinjiro; Yoshinaga, Kazuo; Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Hanyu, Yukio; Yamashita, Masataka; and Katagiri, Kazuharu, 4,883,344, Cl. 350-339.00R.

Katayama, Takao: *See*—
Oshima, Hiroshi; Sadakane, Hirofumi; Katayama, Takao; Takakura, Jinnosuke; and Fujioka, Hisatake, 4,882,897, Cl. 56-11.300.

Kato, Eiji; Kuboshima, Katsumi; and Kaneko, Tomoyuki, to Shizuoka Prefectural Government; and Nihon Dimple Carton Co., Ltd. Heat-insulating packaging boxml4,883,196, Cl. 220-415.000.

Kato Hatsujo Kaisha, Ltd.: *See*—
Takahashi, Yasuo, 4,882,814, Cl. 24-20.00R.

Kato, Heizaburo, to Sankyo Manufacturing Co., Ltd. Material feeding apparatusml4,883,210, Cl. 226-100.000.

Kato, Katsuo: *See*—
Hirose, Ichiro; Sagawa, Takayoshi; Tani, Shichisei; and Kato, Katsuo, 4,883,078, Cl. 131-280.000.

Kato, Shogo: *See*—
Tsurubuchi, Yasuo; and Kato, Shogo, 4,884,110, Cl. 355-319.000.

Kato, Tokunori: *See*—
Sonoda, Takakuni; Tanabe, Kazunori; Iwase, Morikazu; Sangyoji, Kazuo; and Kato, Tokunori, 4,884,082, Cl. 346-105.000.

Kato, Yoichiro: *See*—
Murakami, Takuya; Kato, Yoichiro; and Terauchi, Kenji, 4,883,287, Cl. 280-665.000.

Katoh, Chieji: *See*—
Kawai, Shoichi; Konishi, Masayuki; and Katoh, Chieji, 4,884,254, Cl. 368-21.000.

Katsu, Shin; Nambu, Shutaro; and Shimano, Akio, to Matsushita Electric Industrial Co., Ltd. Mesfet latch circuitml4,883,985, Cl. 307-279.000.

Katz, Solomon H.: *See*—
Widdoes, Harold D.; Katz, Solomon H.; and Cronk, Christine E., 4,883,066, Cl. 128-774.000.

Kaufhold, Wolfgang, to Siemens Aktiengesellschaft. Method and arrangement for controlling a high voltage d-c transmission systemml4,884,181, Cl. 363-35.000.

Kautto, Jorma, to Imatran Voima Oy. Procedure and means for drying moving web materialml4,882,852, Cl. 34-41.000.

Kavesh, Sheldon: *See*—
Kwon, Young D.; Kavesh, Sheldon; and Prevorsek, Dusan C., 4,883,628, Cl. 264-178.00F.

Kavieff, Shelden M., to Jervis B. Webb Company. Article handling apparatus for the storage and delivery of plural types of articlesml4,883,401, Cl. 414-273.000.

Kawabe, Ushio: *See*—
Nishino, Toshikazu; Miyake, Mutsuko; Kawabe, Ushio; Harada, Yutaka; Aoki, Masaaki; and Hirano, Mikio, 4,884,111, Cl. 357-05.000.

Kawada, Yukihiro; and Nakayama, Yoshiaki, to Fuji Photo Film Co., Ltd. Method and apparatus for automatically adjusting white balanceml4,883,360, Cl. 356-402.000.

Kawagishi, Hideyuki: *See*—
Okada, Shinjiro; Yoshinaga, Kazuo; Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Hanyu, Yukio; Yamashita, Masataka; and Katagiri, Kazuharu, 4,883,344, Cl. 350-339.00R.

Kawahara, Yuji: *See*—
Karube, Yoshiyuki; and Kawahara, Yuji, 4,883,375, Cl. 400-55.000.

Kawai, Satoshi: *See*—
Yamanouchi, Kenji; Teraoka, Yutaka; Ikeda, Makoto; Nakamura, Masao; and Kawai, Satoshi, 4,884,095, Cl. 355-1.000.

Kawai, Shoichi; Konishi, Masayuki; and Katoh, Chieji, to Sharp Kabushiki Kaisha. Time display deviceml4,884,254, Cl. 368-21.000.

Kawakami, Keiichi; Takabatake, Mitsuo; and Chiba, Jiro, to Asahi Glass Company Ltd. Composition for ceramic substrate and substrateml4,883,705, Cl. 428-209.000.

Kawamura, Akio: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,883,452, Cl. 600-36.000.

Kawamura, Hideo, to Isuzu Motors Limited. Device for controlling turbocharger with electric rotary machineml4,882,905, Cl. 60-608.000.

Kawasaki, Harumi; and Hara, Masato, to Asahi Kogaku Kogyo K.K. Optical encoder with converging meansml4,883,955, Cl. 250-231.0SE.

Kawashima, Saburo: *See*—
Ohta, Masahiro; Kawashima, Saburo; Snobe, Yoshiho; Tamai, Shoji; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,883,718, Cl. 428-458.000.

Kay, Nathan; McNab, Donald; and Moya, Edward, to Photofinish Cosemetics Inc. Manually-operated fluid dispenser and associated closure capml4,883,204, Cl. 222-192.000.

Kayaba Industry Co., Ltd.: *See*—
Yano, Kenichi; Midorikawa, Hiroshi; Kamei, Toshiaki; and Shizume, Takeharu, 4,883,250, Cl. 248-638.000.

Kaye, Seymour; and Thompson, William R., to Loral Corporation. Alignment of double eccentric aiming system for solid state cameraml4,884,145, Cl. 358-229.000.

Kayser, Larry S.: *See*—
Heynen, Jan; Kayser, Larry S.; and Mony, Georges E., 4,884,285, Cl. 375-25.000.

Kazlauskas, Vidas P.: *See*—
Holen, James T.; and Kazlauskas, Vidas P., 4,883,763, Cl. 436-45.000.

Kearney, Mark B.: *See*—
Koglin, Dennis M.; and Kearney, Mark B., 4,883,992, Cl. 307-491.000.

Keen, Brian T.: *See*—
Argyropoulos, John N.; Derderian, Edmond J.; Keen, Brian T.; and Bumgardner, Timothy G., 4,883,906, Cl. 560-238.000.

Keene, Bruce W.: *See*—
Shug, Austin L.; and Keene, Bruce W., 4,883,672, Cl. 426-2.000.

Kehl, George: *See*—
Abbing, Andreas; Bertling, Hannes; Kehl, George; Mergenthaler, Robert; Rischen, Dietmar; Schafer, Ernst-Dieter; Schmitt, Edgar; and Siegel, Heinz, 4,882,976, Cl. 91-376.00R.

Keith, Jerry M.; and Locht, Camille, to United States of America, Health and Human Services. Pertussis toxin gene: cloning and expression of protective antigenml4,883,761, Cl. 435-320.000.

Kelen, George J., to Del Mar Avionics. Micropotential analyzer—a Holter system with comprehensive analysis capability for very low amplitude electrocardiographic signals and methodml4,883,065, Cl. 128-711.000.

Keller, Reinhold; Schlingmann, Merten; and Platen, Martin, to Hoechst Aktiengesellschaft. Process for the preparation of aspartame and agents for carrying it outml4,883,900, Cl. 560-41.000.

Kemeny, Gabor J.; and Wetzel, David L., to Bran+Luebbe GmbH. Optical analysis method and apparatus having programmable rapid random wavelength accessml4,883,963, Cl. 250-339.000.

Kemira Oy: *See*—
Mattila, Harri O.; and Eskelinen, Pekka J., 4,883,539, Cl. 106-417.000.

Kennedy, George D. Dual-purpose water craftml4,883,012, Cl. 114-61.000.

Kenney, William L., Jr.: *See*—
Bernard, Thomas E.; Sherwin, Gary W.; Kenney, William L., Jr.; and Lewis, Debra A., 4,883,063, Cl. 128-670.000.

Kermelk, Werner: *See*—
Fuchs, Willi; and Kermelk, Werner, 4,883,324, Cl. 301-9.0TV.

Kershaw Manufacturing Company, Inc.: *See*—
Whitaker, John B., Jr., 4,882,860, Cl. 37-191.00A.

Kesling, Haven S., Jr.: *See*—
Shawl, Edward T.; Kesling, Haven S., Jr.; and Liotta, Frank J., Jr., 4,883,908, Cl. 560-344.000.

Kess, Helmut, to Siemens Aktiengesellschaft. PIN diode switchml4,883,984, Cl. 307-256.000.
Kesselman, David A. Tamper deterrent assemblyml4,883,295, Cl. 292-307.00R.
Ketonen, Lauri K. Feeder apparatus for timber harvestersml4,883,159, Cl. 198-626.000.
Keys, John B.; and Rieker, David A., to NCR Corporation. Dynamic RAM refresh circuit with DMA accessml4,884,234, Cl. 364-900.000.
Keys, Kenneth B. Air inlet and automatic pressure adjustment device for a tireml4,883,107, Cl. 152-431.000.
Khosravi, Parviz: *See*—
Dziura, Walter H.; Fusco, Angelo; and Khosravi, Parviz, 4,882,824, Cl. 29-33.200.
Kida, Hideo: *See*—
Samejima, Kazuo; Tsuchihashi, Hironori; Sato, Tsuyoshi; Hamada, Toshihiko; Kida, Hideo; and Kasamatsu, Kiyoto, 4,882,898, Cl. 56-208.000.
Kidron, Ben-Zion: *See*—
Tamir, Ilana; Kidron, Ben-Zion; Wang, Lynn; and Inbar, Michael, 4,883,765, Cl. 436-71.000.
Kiekert GmbH & Co. Kommanditgesellschaft: *See*—
Kleefeldt, Frank, 4,883,298, Cl. 292-341.120.
Kikuchi, Juro: *See*—
Aoki, Norihiko; and Kikuchi, Juro, 4,883,346, Cl. 350-423.000.
Kikuchi, Toshitsugu: *See*—
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.
Kikukawa, Kenji: *See*—
Fujitani, Takashi; Uemura, Hiromi; Kishimoto, Toshiaki; Uchiyama, Masayuki; Shirasu, Isao; Kurokawa, Hideyuki; Nishioka, Takashi; Kikukawa, Kenji; and Sato, Yoshinori, 4,883,185, Cl. 212-147.000.
Kikukawa, Yoshiiku: *See*—
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Kilbane, Farrell M.; Coleman, Richard A.; Dunbar, Frank C.; and Gibson, Alan F., to Armco Inc. Hot dip aluminum coated chromium alloy steelml4,883,723, Cl. 428-653.000.
Kim, Kyoung S., to Upjohn Company, The. Novel beta-lactams containing amino acid substituentsml4,883,869, Cl. 540-355.000.
Kimberly-Clark Corporation: *See*—
Frost, Johnathan E.; Hsu, Eric T.; Jackson, David M.; Olsen, Thomas G.; and Popp, Robert L., 4,883,549, Cl. 156-161.000.
Kimel, Josef: *See*—
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Kimes, Robert H. Toilet for disabled personsml4,882,791, Cl. 4-254.000.
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Kimura, Haruo; Ishidate, Takeo; and Goto, Masao, to Oki Electric Industry Co., Ltd. Bill depositing/dispensing apparatusml4,883,183, Cl. 209-534.000.
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Kimura, Kaoru; Nishi, Masanori; and Minami, Yoshikatsu, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Locus interpolation deviceml4,884,189, Cl. 364-474.310.
Kimura, Kenji: *See*—
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Kimura, Masoyoshi: *See*—
Aiga, Tadao; and Kimura, Masoyoshi, 4,883,677, Cl. 426-420.000.
Kimura, Tsutomu; and Hishinuma, Kazuhiro, to Fuji Photo Film Co., Ltd. Signal detecting method in autoradiographyml4,884,200, Cl. 364-413.130.
Kimura, Yoshiyuki: *See*—
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Kinaga, Yoshimasa: *See*—
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Kindig, Alan L.: *See*—
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King, Francis D.; Hadley, Michael S.; and Martin, Roger T., to Beecham Group plc. of Beecham House. Azabicyclic intermediatesml4,883,874, Cl. 544-47.000.
King, Lawrence A.; and Andrews, Peter J., to Texas Instruments Incorporated. Differential amplifier with low noise offset compensationml4,884,039, Cl. 330-253.000.
Kinge, Nigel; Sanderson, Neil E.; and Mills, David J., to VG Instruments Group Limited. Mass spectrometer including cooling for the ion collection amplifierml4,883,957, Cl. 250-283.000.
Kinoshita, Osamu, to Kabushiki Kaisha Toshiba. Semiconductor laser driving device for stabilizing the optical output thereofml4,884,280, Cl. 372-38.000.
Kinoshita, Yoshio, to NSK-Warner K.K. Retainer for one-way clutchml4,882,941, Cl. 192-45.100.
Kioritz Corporation: *See*—
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Kircher, Albert, Jr.: *See*—
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Kirk, Richard A.; Lee, Peter R.; Hart, Peter B.; Chilton, George A. A.; and Cobb, Alan J., to Plessey Overseas Limited. Method of alignment of LED chipsml4,884,086, Cl. 346-155.000.
Kirk, Ronald L.: *See*—
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Kishi, Hajimu; Tanaka, Kunio; Yukutomo, Masashi; and Matsumura, Teruyuki, to Fanuc Ltd. Numerical control unit file protection systemml4,884,211, Cl. 364-474.220.
Kishimoto, Toshiaki: *See*—
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Kitabatake, Michiharu; and Tominaga, Akira, to Kansai Paint Co., Ltd. Coating resin compositionml4,883,830, Cl. 523-414.000.
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Kitajima, Masao: *See*—
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Kitajima, Yamato; and Hayashi, Yuji, to Minolta Camera Kabushiki Kaisha. Density measuring device for originals in an enlarging/reducing projectorml4,884,100, Cl. 355-68.000.
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Kitamura, Yoshiaki; and Goto, Kinji, to Kitamuragokin Ind. Co., Ltd. Mixing bibcockml4,883,090, Cl. 137-625.410.
Kitamuragokin Ind. Co., Ltd.: *See*—
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Kitanihon Electric Wire Co., Ltd.: *See*—
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Kitaura, Mashio; Nakai, Masaaki; Yoshida, Tadahiro; Kikukawa, Yoshiiku; Omaki, Takanobu; and Taniguchi, Nobuyuki, to Minolta Camera Kabushiki Kaisha. Data transmission system for a cameraml4,884,094, Cl. 354-412.000.
Kitazaki, Yasushi: *See*—
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Kitazawa, Shooji: *See*—
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Kittscher, Peter, to Henkel Kommanditgeschaft auf Aktien. Dispensing storage container and assembly for laundry treatment materialml4,883,203, Cl. 222-143.000.
Kitzinger, Frank; Sprott, David; and Menard, Michel, to Noranda, Inc. Accelerometer for blast monitoringml4,884,250, Cl. 367-180.000.
Kiyomiya, Yutaka; Yamaguchi, Yasumasa; Ushigome, Masahiro; and Murata, Hiroshi, to Nitto Chemical Industry Co., Ltd. Process for producing 2,6-dichlorobenzonitrilemlel4,883,897, Cl. 558-327.000.
Kizaki, Masatoshi: *See*—
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Klaenhammer, Todd R.; and Sanozky-Dawes, Rosemary B., to North Carolina State University. pTN1060, a conjugal plasmid and derivatives thereof that confer phage resistance to group N streptococcimi4,883,756, Cl. 435-252.300.
Klaric, Dinko, to Space Display Systems Pty. Ltd. Connecting devices for structural elementsml4,883,395, Cl. 411-55.000.
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Klein, Richard K.: *See*—
Dixit, Pankaj; Sliwa, Jack; Klein, Richard K.; Sander, Craig S.; and Farnaam, Mohammad, 4,884,123, Cl. 357-71.000.
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Klockner Ferromatik Desma GmbH: *See*—
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Knoll International, Inc.: *See*—
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Koaizawa, Hisashi: *See*—
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Koashi, Katsue; and Yokota, Hiroshi, to Kurashiki Boseki Kabushiki Kaisha. Spectroscopic method and apparatus for measuring sugar concentrationsml4,883,953, Cl. 250-226.000.
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Kobayashi, Masanori, to Fujitsu Limited. Process for cleaning and protecting semiconductor substrateml4,883,775, Cl. 437-225.000.
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Kobayashi, Toshiki: *See*—
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Kobayashi, Toshio, to Asahi Corporation. Toy-game apparatusml4,883,273, Cl. 273-110.000.
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Koepke, Jeffery W.; and Delaney, Dennis D., to Union Oil Company of California. Process for purifying an aqueous, hydrogen sulfide-scrubbing solutionml4,883,601, Cl. 210-710.000.
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Kohl, Gerhard; and Christiansen, Mogens B., to Asea Brown Boveri AG. Apparatus for supplying voltage to component assembliesml4,883,427, Cl. 439-64.000.
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Kong, Samuel K.; Jiang, William Y.; and Chan, Wallace C. W., to Advanced Micro Devices, Inc. Differential line driver with short circuit protectionml4,884,165, Cl. 361-98.000.
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Konon, Walter, to New Jersey Institute of Technology. System for removing contaminants from ground waterml4,883,589, Cl. 210-140.000.
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Kosin, John A.; Preston, Barry W.; and Wallace, David N., to J. M. Huber Corporation. Modified synthetic hydrotalciteml4,883,533, Cl. 106-18.140.
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Koyabu, Seiji; and Fukuda, Tatsuhisa, to Sanyo Electric Co., Ltd.; and Yamano Electric Mfg. Co., Ltd. Bread making device with a clock functionm4,884,253, Cl. 368-10.000.

Koyama, Katsuhiko, to Kabushiki Kaisha Toshiba. X-ray photographing apparatusm4,884,293, Cl. 378-197.000.

Koyama, Mikio; and Tanimoto, Hiroshi, to Kabushiki Kaisha Toshiba. Band-pass filterm4,884,036, Cl. 328-167.000.

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Kozlov, Valery S.; Polyakova, Elena A.; Novikov, Alexei E.; and Krupko, Mikhail T. Magnetizing device with yoke having loosely fitted coil sections for magnetographic inspection of quality of materialsm4,884,028, Cl. 324-213.000.

Kraverath, Robert. Trap primer tail piecem4,882,789, Cl. 4-191.000.

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Kvol, Thijs; and Van Gils, Willibrordus J., to U.S. Philips Corporation. Multiprocessor computer system which includes N parallel-operating modules and an external apparatus, and computer module for use in such a systemm4,884,194, Cl. 364-200.000.

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Kroner, Klaus G.; and Wolber, Jorg, to U. S. Philips Corporation. Circuit arrangement for adjusting a reference level in a periodic signalm4,883,991, Cl. 307-491.000.

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Kuban, Daniel P.; and Perkins, Gerald S., to Martin Marietta Energy Systems, Inc. Dual arm master controller for a bilateral servomanipulatorm4,883,400, Cl. 414-2.000.

Kubek, Dennis J., to Merck & Co. Inc. Recovery of pres2+s antigenm4,883,865, Cl. 530-415.000.

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Kubota Limited: *See*—
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Oshima, Hiroshi; Sadakane, Hirofumi; Katayama, Takao; Takakura, Jinnosuke; and Fujioka, Hisatake, 4,882,897, Cl. 56-11.300.
Samejima, Kazuo; Tsuchihashi, Hironori; Sato, Tsuyoshi; Hamada, Toshihiko; Kida, Hideo; and Kasamatsu, Kiyoto, 4,882,898, Cl. 56-208.000.

Kubota, Tohru: *See*—
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Kudo, Yoshinobu: *See*—
Inoue, Manabu; Taniguchi, Nobuyuki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,884,092, Cl. 354-289.100.
Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 4,884,089, Cl. 354-222.000.

Kudo, Yoshio: *See*—
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Kuehn, Melvin C. Bi-fold hay rake systemm4,882,900, Cl. 56-377.000.

Kuge, Tsukasa; Goto, Masahiro; and Sakane, Isamu, to Canon Kabushiki Kaisha; and Kabushiki Kaisha I.S.T. Elastic rotatable memberm4,883,715, Cl. 428-421.000.

Kugler, Jack L. Lawn mower blade lockm4,882,960, Cl. 81-488.000.

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Kulis, Lawrence J., to United Technologies Automotive, Inc. Panel in-part locatorsm4,883,312, Cl. 296-214.000.

Kumabe, Hisao; and Susaki, Wataru, to Mitsubishi Denki Kabushiki Kaisha. Method of making and separating semiconductor lasersm4,883,771, Cl. 437-129.000.

Kumada, Akira: *See*—
Dohi, Katsuji; Kumada, Akira; and Murata, Michihiro, 4,883,366, Cl. 374-184.000.

Kumagai, Masao: *See*—
Enomoto, Hiromu; Dohgome, Hirofumi; Kumagai, Masao; Nakamura, Toru; and Yoshiyama, Kimitaka, 4,883,975, Cl. 307-290.000.

Kunnemeyer, Otto. Process for the manufacture of wood fiber boardsm4,883,546, Cl. 156-62.200.

Kunzer, Heinz: *See*—
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Kuperstein, Michael. Neural network system for adaptive sensory-motor coordination of multijoint robots for single post-uresm4,884,216, Cl. 364-513.000.

Kupper, Gerd: *See*—
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Kurachi, Yoshiya: *See*—
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Kurashima, Hideo: *See*—
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Kureha Chemical Industry Co., Limited: *See*—
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Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
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Kurita Machinery Manufacturing Co., Ltd.: *See*—
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Kuroiwa, Katsumasa: *See*—
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Kurokawa, Hideyuki: *See*—
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Kuroki Kogyosho Co., Ltd.: *See*—
Kuroki, Takanori, 4,883,292, Cl. 285-55.000.

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Kurosawa, Fumio: *See*—
Ueda, Masanori; Abe, Masayuki; Shitani, Kensai; Yoshimoto, Tetsuo; Yamamoto, Hiroki; and Kurosawa, Fumio, 4,883,544, Cl. 148-2.000.

Kurosawa, Toshiaki: *See*—
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Kurtz, Leonard D.; and LiCausi, Joseph, to BioResearch, Inc. Drainage device with disposable collection chamberm4,883,476, Cl. 604-323.000.

Kusuda, Yasuhiro; and Tottori, Takafumi, to Minolta Camera Kabushiki Kaisha. Multiple color image forming apparatusml4,884,096, Cl. 355-233.000.

Kusumi, Yasuo; Uno, Ken; and Fujino, Takuo, to Hoya Corporation. Process for producing glass moldml4,882,827, Cl. 29-527.200.

Kuwabara, Yohei; and Asaoka, Teruo, to Shizuoka Seiki Co., Ltd. Finishing method employing electro-chemical processml4,883,568, Cl. 204-129.430.

Kuwamoto, Hiroshi; Iwado huichi; Koga, Yoichi; Izushi, Tomoya; Muto, Toshimi; and Kuroi, Nobuomi, to Nippon Kokan Kabushiki Kaisha; and Yushiro Chemical Industry Co., Ltd. Water-soluble temper rolling oil and method of temper rollingml4,883,606, Cl. 252-32.500.

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Kwasegroch, John G.: *See*—
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Kwasniewski, Dale L.: *See*—
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Kwon, Y. D.: *See*—
Harpell, G. A.; Li, H. L.; Kwon, Y. D.; and Prevorsek, D. C., 4,883,700, Cl. 428-113.000.

Kwon, Young D.; Kavesh, Sheldon; and Prevorsek, Dusan C., to Allied-Signal Inc. Method for preparing tenacity and modulus polyacrylonitrile fiberml4,883,628, Cl. 264-178.00F.

Kyburz, Emilio: *See*—
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Kyushu Electric Power Co., Inc.: *See*—
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Kyushu Fujitsu Electronics Limited: *See*—
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Laboratoire L. Lafon: *See*—
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Lachmann, Karl-Heinz; Sundermeyer, Peter; Schreier, Johann; Reindler, Albrecht; and Leininger, Jurgen, to Diehl GmbH & Co. Guided artillery projectile with trajectory regulatorml4,883,239, Cl. 244-3.150.

LaCount, Nelon N., II; Vyavaharkar, Dilip Y.; and Bussjager, Rudy, to Carrier Corporation. Slide plate economizerml4,882,913, Cl. 62-409.000.

Lacy, Robert H.; and Spencer, William A., to Applied Automation, Inc. Backup power system for dynamic memoryml4,884,242, Cl. 365-229.000.

Lafon, Louis: *See*—
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Lagier, Michel, to Thomson-CSF. Anechoic coating for acoustic wavesml4,883,143, Cl. 181-286.000.

Lagushenko, Radomir; and Maya, Jakob, to GTE Products Corporation. Low pressure arc discharge tube having increased voltageml4,884,007, Cl. 313-573.000.

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Lama, William L.: *See*—
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Landa, Kevin. Ski pole carrierml4,883,290, Cl. 280-814.000.

Landt, Don L., to Rockwell International Corporation. Weather radar temperature controlled impatt diodes circuit and method of operationml4,884,077, Cl. 342-202.000.

Lane, David, to AMP Incorporated. Electrical connector for data distribution panelml4,883,433, Cl. 439-607.000.

Lane, William E., Jr.; Leist, Clayton E., II; and Busch, Bradley L. Refrigeration efficiency monitoring systemml4,882,928, Cl. 73-19.000.

Lang, Bruno, to Viscosuisse SA. Process for the production of dimension-stable polyester tire cordml4,883,629, Cl. 264-289.600.

Lang, Dennis R. Combination nozzle and dental floss assembly for oral hygiene flushing apparatusml4,883,080, Cl. 132-322.000.

Lang, Hans-Werner. Wavefront array processorml4,884,193, Cl. 364-200.000.

Lang, Manfred, to Gebr. Happich GmbH. Emergency Hammerml4,882,956, Cl. 81-20.000.

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Langham, Maurice E., to Ocular Blood Flow Laboratories, Inc. Pneumatic pressure probeml4,883,056, Cl. 128-645.000.

Langlie, Ronald H.; and Berg, Jon A., to North Central Plastics, Incorporated. Electric fence insulator for holding various conductor types, including tape-typeml4,883,923, Cl. 174-158.00F.

Langlois, BErnard: *See*—
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Lansing, James P., to JVJ Enterprises, Inc. Semiautomatic frying machine and air filter apparatus thereformI4,883,508, Cl. 55-322.000.

LaPensee, Kenneth R., to United States of America, Army. Trailer/-tractor light system testerml4,884,032, Cl. 324-504.000.

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Larsen, Jan; Gudmandsen, Robert; and Winfeld, Per, to Ortofon Manufacturing A/S. Magnetic system for a stereo pick-up with a movable coilml4,884,262, Cl. 369-136.000.

Larson, Thomas A. Collapsible marine privacy chamberml4,883,016, Cl. 114-363.000.

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Laska, Eugene M.: *See*—
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Lay, William C. Ball catching frame with ball expelling machine connected theretoml4,883,272, Cl. 273-26.00A.

Layland, David J.; and Lavin, John T., to BOC Group, Inc., The. Air separationml4,883,516, Cl. 62-22.000.

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Leavitt, Edward J., Sr.; and Leavitt, Edward J., Jr. Method for applying information to a transparent surfaceml4,883,556, Cl. 156-273.300.

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Lee, Huai-Chuan; Toratani, Hisayoshi; and Meissner, Helmuth E., to Raychem Corporation. Avoidance of surface deterioration of glass during strengthening processesml4,883,523, Cl. 65-30.140.

Lee, Kang W.; and Rabe, Robert L., to Honeywell Inc. Read-only memoryml4,884,238, Cl. 365-105.000.
Lee, Linda G.; and Chen, Chia-Huei, to Becton, Dickinson and Company. Detection of reticulocytes, RNA or DNAml4,883,867, Cl. 536-28.000.
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Legerius, Bengt E.; and Tjaderhane, Jan P. R., to Thorsman & Co. Aktiebolag. Cable jointing clampml4,883,921, Cl. 174-87.000.
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Leonardi, Giovanni M., to RCA Licensing Corporation. Vertical deflection current generatorml4,884,012, Cl. 315-397.000.
Leorat, Francois, to Regie Nationale des Usines Renault. Push button automatic transmission control deviceml4,884,057, Cl. 340-456.000.
Lerailler, Eric; Pierre, Michel; Thiriet, Bernard; and Wacquez, Jean, to Beghin-Say, S.A. Process for preparing a liquid-absorbing compositionml4,883,478, Cl. 604-360.000.
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Lindstrom, Lennart, to Kabmatik AB. Cable switching devicem14,883,230, Cl. 242-25.00R.
Linville, Andrew F., Jr.: *See*—
Hadidi, Mohamed T.; Jurkevics, Andrejs; and Linville, Andrew F., Jr., 4,884,247, Cl. 367-43.000.
Liotta, Frank J., Jr.: *See*—
Shawl, Edward T.; Kesling, Haven S., Jr.; and Liotta, Frank J., Jr., 4,883,908, Cl. 560-344.000.
Lipp, Xaver. Car for traveling along a sheathed cableml4,882,998, Cl. 104-112.000.
Liska, Jean-Louis, to Saft, S.A. Vented nickel-cadmium storage cellml4,883,727, Cl. 429-145.000.
Little, Desiree L.: *See*—
Alvarado, Sergio I.; Crews, Alvin D., Jr.; Wepplo, Peter J.; Doehner, Robert F., Jr.; Brady, Thomas E.; Gange, David M.; and Little, Desiree L., 4,883,914, Cl. 564-91.000.
Litton Systems, Inc.: *See*—
Rahn, John; and Hutchings, Thomas J., 4,884,283, Cl. 372-107.000.
Living Water Corporation: *See*—
Connery, Colin A., 4,883,520, Cl. 62-542.000.
Llewellyn, David T.; and Lichtenberger, William J., to Robertshaw Controls Company. Switching system for plural load circuitml4,883,983, Cl. 307-112.000.
Lobbert, Johannes. Device for hygienic waste collection in hospitals, laboratories and similar establishmentsml4,883,189, Cl. 220-1.00T.
Loce, Robert P.; and Lama, William L., to Xerox Corporation. Printer compensated for vibration-generated scan line errorsml4,884,083, Cl. 346-108.000.
Locht, Camille: *See*—
Keith, Jerry M.; and Locht, Camille, 4,883,761, Cl. 435-320.000.
Lockyer, Robert W.: *See*—
Perry, John H., Jr.; Bhatt, Bharat K.; Capps, Jesse; Eldridge, Paul M.; Greiner, Leonard; Lockyer, Robert W.; Martin, Michelle; McNeice, Raymond R.; Misiaszek, Steven M.; Perry, Stanton S.; Sullivan, Thomas F.; and Campbell, Paul G., 4,883,823, Cl. 518-702.000.
Locwyn Limited: *See*—
Selwyn-Smith, Clive, 4,882,864, Cl. 40-359.000.
Login, Robert B.; Chaudhuri, Ratan K.; Tracy, David J.; and Helioff, Michael W., to GAF Corporation. Quaternized nitrogen containing polycyclic compoundsml4,883,655, Cl. 424-70.000.
Lohmann Anlagenbau GmbH: *See*—
Ostholt, Rudiger; Wahrmann, Jorg; and Becker, Klaus, 4,882,810, Cl. 17-11.000.
Long, Richard W.; and Stinton, Robert T., to Diving Unlimited International, Inc. Underwater diver's dry suit having a permanently compressed cellular layerml4,882,785, Cl. 2-2.10R.
Lonn, Alan H.; and Nelson, Daniel W., to Caterpillar Inc. Bit assembly utilizing carbide insertml4,883,129, Cl. 172-777.000.

Loral Corporation: *See*—
Kaye, Seymour; and Thompson, William R., 4,884,145, Cl. 358-229.000.
Schroeder, Gene F.; and Ellis, Guy T., Jr., 4,884,265, Cl. 370-70.000.
Lorenzo, Joseph P.; and Soref, Richard A., to United States of America, Air Force. Silicon light-emitting diode with integral optical waveguidesml4,884,112, Cl. 357-17.000.
Loser, Hans; Chau-Huu, Tri; and Meinecke, Albrecht, to J.M. Voith GmbH. Dryer section for drying a running web in a paper or board making machinesml4,882,855, Cl. 34-116.000.
Louthan, Rector P.: *See*—
Bresson, Clarence R.; and Louthan, Rector P., 4,883,585, Cl. 209-166.000.
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Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, 4,883,613, Cl. 260-408.000.
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Lovin, Joseph R.: *See*—
Havens, Marvin R.; and Lovin, Joseph R., 4,882,894, Cl. 53-461.000.
Lowe, John A., III; and Nagel, Arthur A., to Pfizer Inc. Piperazinylheterocyclic compoundsml4,883,795, Cl. 514-253.000.
Lowe, Michael: *See*—
Holmes, Peter G.; Lowe, Michael; and Donaghue, Christopher, 4,882,861, Cl. 40-299.000.
Lowry Jr., William L.; Woods, Maurice G.; and Martin, Charles A., to CH Guernsey & Company; Woods, Maurice G.; Woods, Teresa J.; and Applied Thermal Systems, Inc. Combined cycle waste-to-energy plantml4,882,903, Cl. 60-39.182.
LSI Logic Corporation: *See*—
Hui, Alex C.; Wong, Anthony Y.; Dell'Oca, Conrad J.; Wong, Daniel; and Szeto, Roger, 4,884,118, Cl. 357-45.000.
Lucas Industries: *See*—
Farr, Glyn P. R., 4,883,327, Cl. 303-116.000.
Lucas Industries public limited company: *See*—
Campbell, Roy; Price, Anthony G.; and Green, Andrew P., 4,883,149, Cl. 188-264.00E.
Lucas, Stephen W., to Standex International Corporation. Protective mop attachment plateml4,882,804, Cl. 15-244.100.
Lucero, Daniel P., to IIT Research Institute. Methods and apparatus for atmospheric sampling and analysis of trace contaminantsml4,883,505, Cl. 55-84.000.
Luk Lamellen und Kupplungsbau GmbH: *See*—
Maucher, Edmund; Huber, Lothar; Frietsch, Kurt; and Maucher, Paul, 4,883,153, Cl. 192-70.270.
Lunt, James: *See*—
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Luxtron Corporation: *See*—
Sun, Mei H.; Wickersheim, Kenneth A.; and Heinemann, Stanley O., 4,883,354, Cl. 356-128.000.
Lyle, Robert E., Jr.: *See*—
Trujillo, David A.; McMahon, William A., Jr.; and Lyle, Robert E., Jr., 4,883,608, Cl. 252-189.000.
Lynx Golf, Inc.: *See*—
Boone, David D., 4,883,275, Cl. 273-172.000.
M.A.N. Roland Druckmaschinen Aktiengesellschaft: *See*—
Simeth, Claus, 4,882,991, Cl. 101-350.000.
Maag, Henry H. Four-bar variable-resistance frontal calf developing machineml4,883,270, Cl. 272-134.000.
Maas, Joseph W. J., to AFA Products, Inc. Foamer nozzle assembly with air passagewaysml4,883,227, Cl. 239-120.000.
Maass, Fred: *See*—
Ducharme, Cyril L.; Eickhof, Ralph C.; Heider, David A.; Neiberger, Denny W.; and Maass, Fred, 4,883,021, Cl. 119-1.000.
Mabee, Brian D.; and Leigh-Monstevens, Keith V., to Automotive Products plc. Throttle control systemml4,883,037, Cl. 123-399.000.
Mac Engineering & Equipment Company, Inc.: *See*—
Korzenecki, Paul, 4,883,164, Cl. 198-468.400.
MacDonald, James R.; and Fair, Barbara E., to Nalco Chemical Company. Stabilization of soluble manganese in aqueous systemsml4,883,600, Cl. 210-696.000.
Machida, Hajime, to Ricoh Company, Ltd. Magneto-optical recording mediumml4,883,710, Cl. 428-336.000.
MacIsaac, John E., to Sebring Forest Industries, Inc. Artificial firelogml4,883,498, Cl. 44-532.000.
Macke, Jeffrey D.: *See*—
Field, Lamar; Musallam, Hikmat A.; Macke, Jeffrey D.; and Srivastava, Pramod K., 4,883,890, Cl. 558-61.000.
MacKinnon, Francis X.; Horn, James F.; and Pastina, John A., to Gessner Industries, Inc. Tenter frame chain with low friction slide blockml4,882,820, Cl. 26-93.000.
MacLean, Barry L., to MacLean-Fogg Company. Plastic encapsulated nut and washer assemblyml4,883,399, Cl. 411-431.000.
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MacPherson, Edwin J.: *See*—
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Made with Love, Inc.: *See*—
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Maeda, Toshihiro: *See*—
Eda, Yasuyuki; Maeda, Toshihiro; Nishiyama, Kiyoto; and Tashiro, Akira, 4,883,752, Cl. 435-68.000.
Maekawa, Tokuo: *See*—
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,884,087, Cl. 354-75.000.
Mag Dev Inc.: *See*—
Garshelis, Ivan J., 4,882,936, Cl. 73-862.360.
Magee, Frank P.: *See*—
Bloebaum, Roy D.; Magee, Frank P.; and Murray, Thomas P., 4,883,488, Cl. 62.3-20.000.
Mager, Herbert: *See*—
Konrad, Eugen; Mager, Herbert; and Hoffmann, Axel, 4,883,656, Cl. 424-70.000.
Magis Farmaceutici Srl: *See*—
Puricelli, Laura, 4,883,786, Cl. 514-47.000.
Magna-Seal, Inc.: *See*—
Sims, John W., Jr., 4,882,821, Cl. 27-17.000.
Magnavox Government and Industrial Electronics Company: *See*—
Richeson, William E., Jr., 4,883,025, Cl. 123-90.110.
Magyar, Karoly: *See*—
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SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., 4,883,778, Cl. 501-19.000.
Majewski, Donna M.: *See*—
Oakes, Thomas R.; Pedersen, Daniel E.; and Majewski, Donna M., 4,883,828, Cl. 523-122.000.
Maki, Takao: *See*—
Shimanuki, Haruki; Maki, Takao; and Takahashi, Yoshio, 4,883,325, Cl. 303-96.000.
Makishima, Tatsuo; Hirai, Tadaaki; Tsuji, Kazutaka; Ishioka, Sachio; Yamashita, Takashi; Shidara, Keiichi; Yamazaki, Junichi; and Aiba, Masaaki, to Hitachi, Ltd. & Nippon Hoso Kasai. Light-detecting deviceml4,884,011, Cl. 315-368.000.
Makiuchi, Hajime: *See*—
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Malanga, Michael T.: *See*—
Moore, Eugene R.; Dalke, Brian D.; Malanga, Michael T.; and Poindexter, Gary M., 4,883,846, Cl. 526-73.000.
Malizard, Max A.; and Degremont, Jean C., to Dosapro Milton Roy. Variable capacity diaphragm pumpsml4,883,412, Cl. 417-387.000.
Mallory, Thomas H.; McTighe, Timothy; and Noiles, Douglas G., to Joint Medical Products Corporation. Porous-coated artificial jointsml4,883,491, Cl. 623-22.000.
Malsch, Harry K.: *See*—
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Mamin, Pierre-Alexandre; Babel, Bernard; and Balleys, Francois, to Charmilles Technologies S.A. Machine using a wire for use in electroerosionml4,883,934, Cl. 219-69.120.
Manas, Jorge F. Container for making ice cubesml4,883,251, Cl. 249-53.00R.
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Mannesmann Aktiengesellschaft: *See*—
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Rub, Winfried, 4,883,092, Cl. 137-625.650.
Mano, Eiichi: *See*—
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Mansfield, Wilfred P.; Mansfield, Jill; Mansfield, John R.; and Grice, Jeremy H., 4,883,026, Cl. 123-90.160.
Mansfield, Wilfred P.; Mansfield, Jill; Mansfield, John R.; and Grice, Jeremy H., to British Internal Combustion Engine Research Institute, Ltd. Means for adjusting the timing of a valveml4,883,026, Cl. 123-90.160.
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Marchegiano, Joseph E.: *See*—
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Marchetti, Augusto. Adhesive tape feeder, particularly for a cardboard box sealing machine taping unitml4,883,232, Cl. 242-55.200.
Margolis, Peter I. Spark producer in conjunction with a knifeml4,882,841, Cl. 30-125.000.

Marii, Satoshi; Murata, Kunihiko; and Mitsui, Hiroyuki, to Brother Kogyo Kabushiki Kaisha. Automatic sewing machineml4,883,006, Cl. 112-121.120.
Marina, Paolicchi, to Nedo Berutto. Hook-disgorging devicem14,882,871, Cl. 43-53.500.
Marinelli, Orlando M.; and Rector, Mark, to Equipment Tracking Network, Inc. System for continuously establishing and indicating the location of a movable objectml4,884,208, Cl. 364-460.000.
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Martel, Guy G.; and Iler, Edwin A. Leg prosthesism14,883,493, Cl. 623-38.000.
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Martin, Charles A.: *See*—
Lowry Jr., William L.; Woods, Maurice G.; and Martin, Charles A., 4,882,903, Cl. 60-39.182.
Martin, Donald R., to Cooper Power Systems, Inc. Switch mechanism operating rodm14,883,930, Cl. 200-148.00F.
Martin Marietta Corporation: *See*—
Tadros, Maher E., 4,883,541, Cl. 134-3.000.
Martin Marietta Energy Systems, Inc.: *See*—
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Martin, Robert G.; and Swanton, Paul C., to Xerox Corporation. Filament wound foil fusing systemml4,883,941, Cl. 219-216.000.
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Marugg, J. E.; Gansow, Michael A. P.; and Thoen, J. A., to Dow Chemical Company, The. Tertiary amine-containing polyols prepared in a mannich condensation reaction using a mixture of alkanolaminesml4,883,826, Cl. 521-164.000.
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Maruyama Mfg. Co., Ltd.: *See*—
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Maruyama, Setsu; and Takei, Kiyoshi, to Maruyama Mfg. Co., Ltd. Connecting construction for sidestay of heald frame and transverse beamml4,883,095, Cl. 139-91.000.
Maruyama, Teruo, to Matsushita Electric Industrial Co., Ltd. Bearing unitml4,883,367, Cl. 384-114.000.
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Maserang, William L.; and Wright, John W., to Howell Instruments. Electromagnetic interference shielding device for a portable aircraft engine testerml4,884,171, Cl. 361-424.000.
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Massachusetts Institute of Technology: *See*—
Sabel, Bernhard A.; Freese, Andrew; and Saltzman, William M., 4,883,666, Cl. 424-422.000.
Masson, Jean-Paul: *See*—
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Masui, Tomoyuki: *See*—
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Matlack, Albert S., to Hercules Incorporated. Nitrogen compounds that delay the metathesis polymerization of cycloolefinsml4,883,849, Cl. 526-141.000.
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Matsui, Takayuki; Okuyama, Toshiaki; Matsutake, Mitsugu; Takahashi, Junichi; and Ito, Masami, to Hitachi, Ltd. Control apparatus for cascaded converter circuitml4,884,184, Cl. 363-46.000.
Matsui, Toshikazu: *See*—
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Matsuo, Kohtaro; Ezaki, Youichirou; Tobe, Akihiro; Yamazaki, Satoshi; Enda, Kozue; and Kitsukawa, Mariko, to Arakawa Chemical Industries, Ltd.; and Mistubishi Kasei Corporation. Agent for regulating the motional function of gastrointestinal tractml4,883,822, Cl. 514-680.000.
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Mattei, Riccardo; and Rizzoli, Salvatore, to G. D. Societa' per Azioni. Dual-rod cigarette manufacturing machineml4,883,075, Cl. 131-84.400.
Mattila, Harri O.; and Eakelinen, Pekka J., to Kemira Oy. Coated silicate particlesml4,883,539, Cl. 106-417.000.
Mauchan, Donald E., to Polaroid Corporation. Kit for converting 35 mm camera for use with self-developing transparency filmml4,884,088, Cl. 354-86.000.
Maucher, Edmund; Huber, Lothar; Frietsch, Kurt; and Maucher, Paul, to Luk Lamellen und Kupplungsbau GmbH. Friction clutchml4,883,153, Cl. 192-70.270.

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Mauleon, Jean-Louis; and Sigaud, Jean-Bernard, to Compagnie de Raffinage et de Distribution Total France. Process for the catalytic cracking of hydrocarbons in a fluidized bed and their applicationsml4,883,583, Cl. 208-113.000.

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Maxim, Peter E.; and Veltri, Robert W., to American Biotechnology Company. Method of treating inflammation in mammals utilizing ketobutyrolactones and furylbutyrolactonesml4,883,813, Cl. 514-470.000.

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McAllister, Jerome W.; Pham, Lien-Huong T.; and Sowman, Harold G., to Minnesota Mining and Manufacturing Company. Ceramic articles containing silicon carbideml4,883,779, Cl. 501-88.000.

McArthur, Patrick D. Versatile sports packml4,883,207, Cl. 224-153.000.

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McClanahan, David D.: *See—*
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Meehan, Kermit E.; Nichols, William T.; Meehan, Timothy S.; and Essig, Robert A. Refrigeration system for product display enclosuresml4,882,910, Cl. 62-256.000.

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Misra, Raj N. 7-Oxabicycloheptane imino interphenyleneoxy substituted prostaglandin analogs useful in the treatment of thrombotic and vasospastic diseaseml4,883,809, Cl. 514-469.000.

Misra, Raj N.; and Hall, Steven E. 7-Oxabicycloheptane imino interphenylene substituted prostaglandin analogs useful in the treatment of thrombotic diseaseml4,883,811, Cl. 514-469.000.

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Miyazaki, Kenichi; and Morigaki, Tadahiko, to Nissan Motor Co., Ltd. Roof structure for modular vehicle bodyml4,883,310, Cl. 296-210.000.

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Mizuhara, Howard, to GTE Products Corporation. Silver-copper-titanium brazing alloy containing crust inhibiting elementml4,883,745, Cl. 420-502.000.

Mizukami, Toshiaki, to Sharp Kabushiki Kaisha. Circuit for precharging a busml4,883,989, Cl. 307-448.000.

Mizunoya, Nobuyuki: *See*—
Sato, Hideki; Mizunoya, Nobuyuki; Asai, Hironori; Anzai, Kazuo; and Hatano, Tsuyoshi, 4,883,704, Cl. 428-209.000.

Mizusawa, Eugene A.; Paone, Donald J.; Casella, Tracey L.; Flores, Dorothy L.; Choy, Clement K.; Gerritsen, Jan; Heiskell, Ronald E.; Dewees, Thomas G.; and Ellgen, Jon L., to Clorox Company, The. Rinse release laundry additive and dispenserml4,882,917, Cl. 68-17.00A.

Mobay Corporation: *See*—
Slack, William E., 4,883,909, Cl. 560-351.000.

Mobil Oil Company: *See*—
Hadidi, Mohamed T.; Jurkevics, Andrejs; and Linville, Andrew F., Jr., 4,884,247, Cl. 367-43.000.

Mobil Oil Corp.: *See*—
Benoit, Gordon L., 4,883,450, Cl. 493-196.000.
Jennings, Alfred R., Jr., 4,883,124, Cl. 166-307.000.
Laster, Stanley J.; Meek, Robert A.; and Shirley, Thomas E., 4,884,248, Cl. 367-73.000.

Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, to Fuji Photo Film Co., Ltd. Photographic film package and method of making the sameml4,884,087, Cl. 354-75.000.

Mochizuki, Hajime: *See*—
Chiba, Kazuo; Ohishi, Yoshiaki; Migita, Jituo; Mochizuki, Hajime; and Kobayashi, Takao, 4,883,950, Cl. 235-440.000.

Mochizuki, Hiroshi; Tamaki, Reiji; Arima, Junichi; Ikegami, Masaaki; Tanaka, Eisuke; and Saito, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device and method for making the sameml4,884,120, Cl. 357-68.000.

Mochizuki, Masahiro, to Aisin Seiki Kabushiki Kaisha. Supercharging pressure control deviceml4,883,041, Cl. 123-564.000.

Mockli, Peter, to Ciba-Geigy Corporation. Methine-azo compounds containing cyclic cationic ammonium groupsml4,883,866, Cl. 534-606.000.

Moeller, Arnold T. Retrofit refueling apparatus for an overhead fuel manifoldml4,883,229, Cl. 239-587.000.

Molecular Devices Corporation: *See*—
Humphries, Gillian M. K.; Parce, John W.; and McConnell, Harden M., 4,883,579, Cl. 204-403.000.

Molten, Robert: *See*—
Harp, James J.; and Molten, Robert, 4,883,140, Cl. 180-116.000.

Moncada, Salvador, to Burroughs Wellcome Co. Ethersml4,883,810, Cl. 514-469.000.

Moncada, Salvador, to Burroughs Wellcome Co. Treatment of hypertension using prostacyclinml4,883,812, Cl. 514-469.000.

Monier Limited: *See*—
Healy, Christopher L.; and Rankin, Ken, 4,882,889, Cl. 52-336.000.

Monsanto Company: *See*—
Ruest, Dennis A., 4,883,911, Cl. 562-581.000.

Monson, Donald R.; and Leblanc, James A., to Donaldson Company, Inc. Filter cap for clean room ceiling grid systemml4,883,513, Cl. 55-385.200.

Mony, Georges E.: *See*—
Heynen, Jan; Kayser, Larry S.; and Mony, Georges E., 4,884,285, Cl. 375-25.000.

Monyihan, Cornelius T.: *See*—
Vacha, Lubos J. B.; Monyihan, Cornelius T.; and Schultz, Peter C., 4,883,339, Cl. 350-96.340.

Monzyk, Bruce F.; and Woodard, Lloyd A. Device for measuring subsurface temperatures of liquid bodies, useful for determining optimum fishing locationsml4,883,365, Cl. 374-136.000.

Moon, John H., Sr. Self-contained motor vehicle maintenance interval monitorml4,884,054, Cl. 340-309.150.

Moore Business Forms, Inc.: *See*—
Brown, Peter E., 4,883,220, Cl. 229-69.000.

Moore, Dennis G. Lamp with built-in on-off switchml4,884,179, Cl. 362-295.000.

Moore, Eugene R.; Dalke, Brian D.; Malanga, Michael T.; and Poindexter, Gary M., to Dow Chemical Company, The. Anionic polymerization of purified monovinylidene aromatic monomer feed stockml4,883,846, Cl. 526-73.000.

Moore, John S.: *See*—
Anderson, Jeffrey J.; Moore, John S.; Deur, Ted E.; and Roy, Joy, 4,883,219, Cl. 228-190.000.

Moore, Timothy M.: *See*—
Van der Woude, Gerbrig W.; and Moore, Timothy M., 4,883,394, Cl. 411-51.000.

Moore, William C., to Dryvit System, Inc. Laminated wall constructionml4,882,888, Cl. 52-309.900.

Mor, Yeshayahu; and Sandman, Leonardo, to Performance Semiconductor Corporation. Microprocessor system with extended arithmetic logic unitml4,884,231, Cl. 364-736.000.

Morflex Chemical Company, Inc.: *See*—
Hull, Ezekiel H.; and Frappier, Edward P., 4,883,905, Cl. 560-180.000.

Morgan, Edward J.; and Corbett, William D., to Brunswick Corporation. Evaporable foam pattern for use in a casting process and having load transfer wallsml4,883,110, Cl. 164-249.000.

Morgan, Ronnie G., to Nabisco Brands, Inc. Directional flow bar extruderml4,883,421, Cl. 425-135.000.

Mori, Masanori: *See*—
Kobayashi, Toshimitsu; Inagaki, Akio; Kobayashi, Yasuhiro; Mori, Masanori; and Sakakibara, Takashi, 4,883,448, Cl. 474-260.000.

Mori, Ryuichiro; Akiyama, Tatsuhiko; and Fukudome, Katsuyuki, to Mitsubishi Denki Kabushiki Kaisha. Resin-encapsulated semiconductor deviceml4,884,124, Cl. 357-72.000.

Mori, Tetsuzo: *See*—
Ozawa, Masakazu; Ozawa, Kunitaka; Hatanaka, Katsunori; Suzuki, Tetsuo; Mori, Tetsuzo; Shiina, Tadashi; and Ebinuna, Ryuichi, 4,884,085, Cl. 346-136.000.

Morifuki, Yaso, to Jex Co., Ltd. Milking equipmentml4,883,464, Cl. 604-74.000.

Morigaki, Tadahiko: *See*—
Miyazaki, Kenichi; and Morigaki, Tadahiko, 4,883,310, Cl. 296-210.000.

Morikawa, Michio; and Hayashi, Torahiko, to Rheon Automatic Machinery Co., Ltd. Apparatus for continuously producing at a substan-

tially constant flow rate a strip dough of substantially uniform dimensionsml4,883,417, Cl. 425-140.000.

Morimoto, Toshiki; and Watanabe, Seiji, to Kabushiki Kaisha Toshiba. Semiconductor IC (integrated circuit) devicesml4,883,980, Cl. 307-465.100.

Morinaga, Akio; Yagi, Isaburo; Maruyama, Hideo; and Yamamoto, Akifumi, to Tokyo Gas Co., Ltd.; and Ashimori Industry Co., Ltd. Method for lining pipe lines with a pressurized gasml4,883,557, Cl. 156-287.000.

Morishita, Mimpei: *See*—
Azukizawa, Teruo; Morishita, Mimpei; Yokoyama, Toyohiko; Takaki, Shigeo; Yuyama, Yoshio; and Noda, Akitaka, 4,882,999, Cl. 104-281.000.

Morishita, Nobumichi: *See*—
Nakamoto, Kouji; Morishita, Nobumichi; and Aoyama, Masahide, 4,883,821, Cl. 514-617.000.

Morita, Shuji: *See*—
Ninomiya, Kunihiro; Saito, Ken-Ichi; Morita, Shuji; Tobe, Akihiro; and Nitta, Issei, 4,883,802, Cl. 514-278.000.

Moriuchi, Yousuke: *See*—
Kousai, Tadashi; Ishida, Toshinobu; and Moriuchi, Yousuke, 4,883,468, Cl. 604-164.000.

Moriyama, Takamasa: *See*—
Iwanami, Teruo; Moriyama, Takamasa; and Asano, Kuniyoshi, 4,883,696, Cl. 428-35.400.

Morrell, Mark L.: *See*—
Carpenter, Larry L.; Morrell, Mark L.; and Schrauth, Peter A., 4,883,528, Cl. 65-275.000.

Morris, Antone W. Flow and seismic sensitive safety valve for gaseous fluidsml4,883,081, Cl. 137-39.000.

Morris, James A.; Morris, Terry F.; and Birdsall, Frank O. Personal security systemml4,884,132, Cl. 358-93.000.

Morris, Roger E.: *See*—
Riew, Changkiu K.; and Morris, Roger E., 4,883,841, Cl. 525-148.000.

Morris, Terry F.: *See*—
Morris, James A.; Morris, Terry F.; and Birdsall, Frank O., 4,884,132, Cl. 358-93.000.

Moser, Bernhard; Peetz, Wolfang; and Hugger, Hermann, to Hawera Probst GmbH & Co. Apparatus for rock drillml4,883,135, Cl. 175-323.000.

Motorola, Inc.: *See*—
Djennas, Frank; and Mitchell, Curtis W., 4,883,774, Cl. 437-211.000.

Mount Isa Mines Limited: *See*—
Dekker, David L., 4,884,229, Cl. 364-724.110.

Moxness, James G., to Minnesota Minning and Manufacturing Company. Housing for a sonic transducerml4,884,251, Cl. 367-188.000.

Moya, Edward: *See*—
Kay, Nathan; McNab, Donald; and Moya, Edward, 4,883,204, Cl. 222-192.000.

Moyne, Jose ; and Disdier, Camille, to Rhone-Poulenc Chimie de Base. Preparation of para-acyloxybenzene sulfonatesml4,883,612, Cl. 260-402.000.

MTR Enterprises: *See*—
Kaplan, Ida B., 4,883,442, Cl. 446-320.000.

Muccitelli, John A.; and Feldman, Nancy A., to Betz Laboratories, Inc. Electrode assembly for in-situ measurement of electrolytic conductivity of boiler waterml4,883,566, Cl. 204-1.00T.

Muckenhirn, Dieter. Contact lens providing a central spherical region bounded by a circumscribing aspherical regionml4,883,350, Cl. 351-160.00R.

Mueller Company: *See*—
Weller, Michael E.; and Daghe, Joseph L., 4,883,085, Cl. 137-315.000.

Mueller, Robert: *See*—
Gausrab, Klaus; Hauser, Joachim; and Mueller, Robert, 4,882,950, Cl. 74-714.000.

Mueller, Wolfgang R.; and Spencer, Gwynne W., II, to International Business Machines Corporation. Stacked double density memory module using industry standard memory chipsml4,884,237, Cl. 365-63.000.

Muller, Siegfried, to Papst Motoren KG. Brushless DC motor inner tachometerml4,884,000, Cl. 310-268.000.

Munden, Dennis L.: *See*—
Cole, Michael; Munden, Dennis L.; and Ryan, Marilynn J., 4,883,531, Cl. 73-9.000.

Murakami, Takuya; Kato, Yoichiro; and Terauchi, Kenji, to Nissan Motor Co., Ltd. Double link type suspension system with stabilizer barml4,883,287, Cl. 280-665.000.

Muramatsu, Masanori: *See*—
Arimoto, Shinobu; and Muramatsu, Masanori, 4,884,147, Cl. 358-443.000.

Muramoto, Hisaichi; Ishii, Keizou; and Miyazono, Tadafumi, to Nippon Paint Co., Ltd. End carboxyl bearing reactive vinyl monomers and preparation thereofml4,883,899, Cl. 560-14.000.

Muramoto, Ken'ichi, to Kabushiki Kaisha Toshiba. Double-diffused, insulated-gate, field effect transistorml4,884,113, Cl. 357-23.400.

Muraoka, Yuusuke: *See*—
Sakai, Takamasa; and Muraoka, Yuusuke, 4,883,424, Cl. 432-77.000.

Murasa International: *See*—
Simms, Robert A., 4,884,275, Cl. 372-9.000.

Murase, Takao; and Yoshimura, Tsunenori, to NGK Insulators, Ltd. Resistance ceramic heater with mutually connected heat-generating conductors, and electrochemical element or oxygen analyzer using such ceramic heaterml4,883,947, Cl. 219-553.000.

Murata, Hiroshi: *See*—
Kiyomiya, Yutaka; Yamaguchi, Yasumasa; Ushigome, Masahiro; and Murata, Hiroshi, 4,883,897, Cl. 558-327.000.

Murata, Kunihiko: *See*—
Marii, Satoshi; Murata, Kunihiko; and Mitsui, Hiroyuki, 4,883,006, Cl. 112-121.120.

Murata Mfg. Co., Ltd.: *See*—
Dohi, Katsuji; Kumada, Akira; and Murata, Michihiro, 4,883,366, Cl. 374-184.000.
Tanabe, Takeshi; and Hori, Toshio, 4,883,920, Cl. 174-68.500.

Murata, Michihiro: *See*—
Dohi, Katsuji; Kumada, Akira; and Murata, Michihiro, 4,883,366, Cl. 374-184.000.

Murphy, Kent D. Resilient retainer for elongate objects of different diameters and widthsml4,882,816, Cl. 24-555.000.

Murray, Thomas P.: *See*—
Bloebaum, Roy D.; Magee, Frank P.; and Murray, Thomas P., 4,883,488, Cl. 62.3-20.000.

Murthi, Enjeti: *See*—
Menon, Suresh; and Murthi, Enjeti, 4,884,042, Cl. 331-113.00R.

Musallam, Hikmat A.: *See*—
Field, Lamar; Musallam, Hikmat A.; Macke, Jeffrey D.; and Srivastava, Pramod K., 4,883,890, Cl. 558-61.000.

Mushya, Takashi, to Nifco, Inc. Mounting memberml4,883,382, Cl. 403-405.100.

Muto, Toshimi: *See*—
Kuwamoto, Hiroshi; Iwado, Shuichi; Koga, Yoichi; Izushi, Tomoya; Muto, Toshimi; and Kuroi, Nobuomi, 4,883,606, Cl. 252-32.500.

Muttoni, Mario, to Spidem S.r.L. Percolator holding pan for espresso coffee making machinesml4,882,982, Cl. 99-295.000.

Myers, Roderick J.; and Delgado, Jorge H., to Conoco, Inc. Apparatus for tensioning a riserml4,883,387, Cl. 405-195.000.

Myers, Stephen E.: *See*—
McLoughlin, Robert H.; Park, George B.; Cook, John; and Myers, Stephen E., 4,882,828, Cl. 29-623.100.

Nabisco Brands, Inc.: *See*—
Morgan, Ronnie G., 4,883,421, Cl. 425-135.000.

Nagai, Hiroyuki: *See*—
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshinki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.

Nagaike, Sadanori: *See*—
Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita, Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, 4,883,711, Cl. 428-336.000.

Nagamoto, Itsushi; Nakanishi, Tatsuo; and Yamashita, Tomoharu, to Yamaha Corporation. Method for producing a golf club headml4,883,623, Cl. 264-108.000.

Nagarwalla, Pheroze J.: *See*—
Bellis, Kenneth E.; Brown, Jackson E.; Nagarwalla, Pheroze J.; Niedermeyer, William; and Pawlak, Paul, 4,883,558, Cl. 156-292.000.

Nagasaka, Nobusuke, to Brother Kogyo Kabushiki Kaisha. Needle clamp for sewing machineml4,883,007, Cl. 112-226.000.

Nagasawa, Takeshi: *See*—
Abe, Yoshihito; Yaginuma, Katsuhiro; Nagasawa, Takeshi; and Kuroiwa, Katsumasa, 4,883,863, Cl. 530-331.000.

Nagasawa, Tamami; and Fukunaga, Takahiro, to Sharp Kabushiki Kaisha. Mechanism for reciprocating an original table of a copying apparatusml4,884,108, Cl. 355-234.000.

Nagase, Hiroshi: *See*—
Watanabe, Masao; and Nagase, Hiroshi, 4,883,735, Cl. 430-109.000.

Nagashima, Tetsuya; Matsushita, Eiji; Yuchi, Sadataka; and Kitajima, Akira. Fire alarm systemml4,884,222, Cl. 364-550.000.

Nagata, Masayuki: *See*—
Yokota, Minoru; Nagata, Masayuki; Saito, Shigeo; and Yamada, Yuichi, 4,883,922, Cl. 174-125.100.

Nagato, Hitoshi: *See*—
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; Kanai, Tsutomu; and Matsui, Toshikazu, 4,884,080, Cl. 346-46.000.

Nagel, Arthur A.: *See*—
Lowe, John A., III; and Nagel, Arthur A., 4,883,795, Cl. 514-253.000.

Nagura, Osamu: *See*—
Takemoto, Masayuki; Nagura, Osamu; Nomura, Yukio; and Yasuda, Minoru, 4,883,858, Cl. 528-322.000.

Nagy, Gabor S.; Akeson, Richard C.; Sweenie, Richard E.; Novak, Mark E.; Malsch, Harry K.; Widule, Thomas J.; Ding, Gustav L. P.; and Jackson, Jared K., to Automatik Machinery Corporation. Melt indexer system with robot operationml4,882,930, Cl. 73-56.000.

Naito, Takanobu: *See*—
Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, 4,883,879, Cl. 546-280.000.

Nakagaki, Masayuki: *See*—
Miyazima, Koichiro; Tomita, Keiko; and Nakagaki, Masayuki, 4,883,665, Cl. 424-417.000.

Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, to Banyu Pharmaceutical Co., Ltd. 7-amino-3-(substituted isoindolinium)methyl-3-cephem derivativesml4,883,868, Cl. 540-222.000.

Nakagomi, Kazuhito, to Nippon Seimitsu Kogyo Kabushiki Kaisha. Exposure control device in a cameraml4,884,091, Cl. 354-271.100.
Nakai, Masaaki: *See*—
Kitaura, Mashio; Nakai, Masaaki; Yoshida, Tadahiro; Kikukawa, Yoshiiku; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,884,094, Cl. 354-412.000.
Nakajima, Kazuhiro: *See*—
Fukuda, Tsuguhiro; Sato, Hiroshi; and Nakajima, Kazuhiro, 4,883,379, Cl. 400-697.100.
Nakamoto, Kouji; Morishita, Nobumichi; and Aoyama, Masahide, to Eisai Co., Ltd. Agent for treating hyperuricemiaml4,883,821, Cl. 514-617.000.
Nakamoto, Kouji; Suzuki, Takeshi; Abe, Shinya; Hayashi, Kenji; Kajiwara, Akiharu; Yamatsu, Isao; Otsuka, Issei; and Shiojiri, Hiroyuki, to Eisai Co., Ltd. Polyprenyl Compoundsml4,883,916, Cl. 564-186.000.
Nakamura, Hiroto: *See*—
Fukushima, Hitoshi; Takei, Katsumori; Iwamoto, Kohei; and Nakamura, Hiroto, 4,884,081, Cl. 346-74.600.
Nakamura, Katsumi: *See*—
Miyazaki, Kenichi; Nakamura, Katsumi; and Hagiwara, Taro, 4,883,309, Cl. 296-194.000.
Nakamura, Kiyoshi: *See*—
Ando, Takeki; Nakamura, Kiyoshi; Mine, Toshisuke; Inaba, Hiromi; Kurosawa, Toshiaki; Nakazato, Masao; and Sakai, Yoshio, 4,884,182, Cl. 363-37.000.
Nakamura, Masanobu, to Kokan Kako Co., Ltd. Method of connecting a tubular member with an annular membermml4,882,825, Cl. 29-156.40R.
Nakamura, Masao: *See*—
Yamanouchi, Kenji; Teraoka, Yutaka; Ikeda, Makoto; Nakamura, Masao; and Kawai, Satoshi, 4,884,095, Cl. 355-1.000.
Nakamura, Toru: *See*—
Enomoto, Hiromu; Dohgome, Hirofumi; Kumagai, Masao; Nakamura, Toru; and Yoshiyama, Kimitaka, 4,883,975, Cl. 307-290.000.
Nakamura, Toshihiko: *See*—
Ishizuka, Akira; and Nakamura, Toshihiko, 4,884,233, Cl. 364-786.000.
Nakamura, Toshinobu, to Shinagawa Shoko Co., Ltd. Banding clipml4,882,813, Cl. 24-16.0PB.
Nakanishi, Tatsuo: *See*—
Nagamoto, Itsushi; Nakanishi, Tatsuo; and Yamashita, Tomoharu, 4,883,623, Cl. 264-108.000.
Nakanishi, Tsutomu, to C.S.U. Ltd. Rotary structureml4,883,370, Cl. 384-490.000.
Nakanishi, Tsuyoshi: *See*—
Kotani, Haruo; Tomita, Katsuhiko; Yada, Takaaki; and Nakanishi, Tsuyoshi, 4,883,563, Cl. 156-645.000.
Nakanishi, Yoshimi: *See*—
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,883,452, Cl. 600-36.000.
Nakaniwa, Shinpei, to Japan Electronic Control Systems Co., Ltd. Fuel supply control system for multi-cylinder internal combustion engine with feature of suppression of output fluctuation between individual engine cylindersml4,883,038, Cl. 123-436.000.
Nakano, Fumio: *See*—
Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, 4,883,868, Cl. 540-222.000.
Nakano, Takahiro: *See*—
Ozawa, Naoki; Akiyama, Toshiyuki; Takahashi, Kenji; Mimura, Itaru; and Nakano, Takahiro, 4,884,129, Cl. 358-44.000.
Nakashima, Yoshimoto: *See*—
Nakatsuka, Shin-ichi; Hayashi, Masatoshi; Yokomori, Sadakazu; Nakashima, Yoshimoto; Hatayama, Katsuo; and Araki, Hiroaki, 4,883,876, Cl. 546-51.000.
Nakatsuka, Shin-ichi; Hayashi, Masatoshi; Yokomori, Sadakazu; Nakashima, Yoshimoto; Hatayama, Katsuo; and Araki, Hiroaki, to Taisho Pharmaceutical Co., Ltd. Acylated vincaminic acid derivativesml4,883,876, Cl. 546-51.000.
Nakayama, Shigeyuki, to Kabushiki Kaisha Kenwood. Spread spectrum receiverml4,884,284, Cl. 375-1.000.
Nakayama, Yoshiaki: *See*—
Kawada, Yukihiro; and Nakayama, Yoshiaki, 4,883,360, Cl. 356-402.000.
Nakazato, Masao: *See*—
Ando, Takeki; Nakamura, Kiyoshi; Mine, Toshisuke; Inaba, Hiromi; Kurosawa, Toshiaki; Nakazato, Masao; and Sakai, Yoshio, 4,884,182, Cl. 363-37.000.
Nakazawa, Yoshihiro; Kudou, Masayuki; Iijima, Satoshi; Sanada, Katsuiki; and Matsuo, Yoshihiro, to Honda Giken Kogyo Kabushiki Kaisha. Position detecting device for a motorcycle side standml4,883,284, Cl. 280-293.000.
Nalco Chemical Company: *See*—
MacDonald, James R.; and Fair, Barbara E., 4,883,600, Cl. 210-696.000.
Nalepka, Raymond; and Huffer, Russell, to Guardian Industries Corporation. Multi-layer low emissivity thin film coatingml4,883,721, Cl. 428-623.000.
Namba Press Works Co., Ltd.: *See*—
Goto, Fumio; and Otawa, Taro, 4,883,632, Cl. 264-544.000.
Nambu, Shutaro: *See*—
Katsu, Shin; Nambu, Shutaro; and Shimano, Akio, 4,883,985, Cl. 307-279.000.
Namiki, Takayuki: *See*—
Hashimoto, Masashi; Oku, Teruo; Ito, Yoshikuni; Namiki, Takayuki; Sawada, Kozo; Kasahara, Chiyoshi; and Baba, Yukihisa, 4,883,800, Cl. 514-259.000.
Narita, Noritsugu: *See*—
Gohbayashi, Masayoshi; Narita, Noritsugu; and Maruno, Makoto, 4,883,902, Cl. 560-75.000.
Naslund, Erik I.: *See*—
Heaney, Richard; and Naslund, Erik I., 4,883,449, Cl. 493-43.000.
Nathanson, James A., to General Hospital Corporation, The. Xanthine derivative pest control agentsml4,883,801, Cl. 514-263.000.
National Semiconductor Corporation: *See*—
Cleeves, James M.; and Heard, James G., 4,883,772, Cl. 437-200.000.
Menon, Suresh; and Murthi, Enjeti, 4,884,042, Cl. 331-113.00R.
Natori, Tatsuo; Shimaguchi, Takashi; Watanabe, Akihide; and Yamada, Toshihiro, to Hitachi, Ltd. Method for forming cast article by slip castingml4,883,621, Cl. 264-86.000.
Natsuume, Tadao: *See*—
Hamaguchi, Tetsuo; Ueda, Tsunehisa; and Natsuume, Tadao, 4,883,535, Cl. 106-93.000.
Naville, Charles; Spitz, Simon; and Rocroi Jean-Pierre, to Compagnie Generale de Geophysique. Method and system for acquisition and separation of the effects of electromagnetic fields to predict earthquakesml4,884,030, Cl. 324-344.000.
Navistar International Transportation Corp.: *See*—
Hacker, Jay P.; and Laukhuf, Rodney A., 4,883,307, Cl. 296-180.200.
NCR Corporation: *See*—
Jones, Ronald; and Amy, Michael E., 4,884,287, Cl. 375-121.000.
Keys, John B.; and Rieker, David A., 4,884,234, Cl. 364-900.000.
Neault, Garrett J.: *See*—
Primavera, Stephen W.; Burbank, John J., Jr.; and Neault, Garrett J., 4,883,588, Cl. 210-117.000.
Nebon, Jean-Pierre: *See*—
Baginski, Pierre; Nebon, Jean-Pierre; and Bur, Marc, 4,884,047, Cl. 335-10.000.
NEC Corporation: *See*—
Goto, Kunihiro, 4,884,268, Cl. 370-102.000.
Ishizuka, Akira; and Nakamura, Toshihiko, 4,884,233, Cl. 364-786.000.
Mine, Shinji, 4,884,167, Cl. 361-382.000.
Odagiri, Yuichi, 4,884,279, Cl. 372-29.000.
Okada, Yoshitsugu, 4,882,839, Cl. 29-853.000.
Suzuki, Hiroshi, 4,884,263, Cl. 370-16.000.
Suzuki, Takao; and Uekido, Kouzou, 4,883,429, Cl. 439-74.000.
Umeki, Yoshitaka, 4,883,990, Cl. 307-473.000.
NEC Home Electronics Ltd.: *See*—
Sakai, Yasuo; and Wada, Morihito, 4,882,987, Cl. 101-13.040.
Nedo Berutto: *See*—
Marina, Paolicchi, 4,882,871, Cl. 43-53.500.
Neff, Brian W.: *See*—
Spivey, Brett A.; Neff, Brian W.; and Dunn, Murray R., 4,883,348, Cl. 350-503.000.
Neiberger, Denny W.: *See*—
Ducharme, Cyril L.; Eickhof, Ralph C.; Heider, David A.; Neiberger, Denny W.; and Maass, Fred, 4,883,021, Cl. 119-1.000.
Neiman, Richard D., to Vesper Corporation. Hanger for paint conveyor linenml4,883,165, Cl. 198-682.000.
Nelson, Daniel W.: *See*—
Lonn, Alan H.; and Nelson, Daniel W., 4,883,129, Cl. 172-777.000.
Nelson, Richard V.; and Stephen, John F., to ICI Americas Inc. Melamine-based light stabilizers for plasticsml4,883,831, Cl. 524-100.000.
Nelson, Richard V.; and Stephen, John F., to ICI Americas Inc. Triazine-based light stabilizers for plasticsml4,883,860, Cl. 524-98.000.
Nelson, Robert E.: *See*—
Diederich, Walter J.; and Nelson, Robert E., 4,883,619, Cl. 264-60.000.
Nemcovsky, Rhonda L.: *See*—
Jones, Gerald M.; and Nemcovsky, Rhonda L., 4,882,838, Cl. 29-829.000.
Nemoto, Tugio: *See*—
Ishii, Satoru; Nemoto, Tugio; and Aiki, Kunio, 4,883,342, Cl. 350-320.000.
Nepera, Inc.: *See*—
Feitler, David; and Wetstein, Henry, 4,883,881, Cl. 546-353.000.
Neppl, Franz; and Winnerl, Josef, to Siemens Aktiengesellschaft. Circuit containing integrated bipolar and complementary MOS transistors on a common substrateml4,884,117, Cl. 357-43.000.
Nereau, Jean-Pierre: *See*—
Batteux, Pierre; and Nereau, Jean-Pierre, 4,883,931, Cl. 200-148.00R.
Neri, Armando, to G.D Societa' Per Azioni. Pick-up unit for withdrawing cigarette samples from a mass of cigarettesml4,882,938, Cl. 73-863.910.
Nestaas, Eirik: *See*—
Gutnick, David L.; Nestaas, Eirik; Rosenberg, Eugene; and Sar, Nechemia, 4,883,757, Cl. 435-252.100.
Nestec S.A.: *See*—
Stein, Jehuda, 4,883,682, Cl. 426-580.000.
Netz, Edmund: *See*—
Weidman, William J.; and Netz, Edmund, 4,883,626, Cl. 264-156.000.
Neubig, Richard: *See*—
Counsell, Raymond E.; Van Dort, Marcian; and Neubig, Richard, 4,883,649, Cl. 424-1.100.

Neumann, Eugene F.: *See*—
August, Melvin C.; Neumann, Eugene F.; Bowen, Stephen A.; and Williams, John T., 4,884,168, Cl. 361-382.000.
Neumann, Peter: *See*—
Leyrer, Reinhold; and Neumann, Peter, 4,883,732, Cl. 430-49.000.
Neumiller, Phillip J.: *See*—
Etter, Robert M.; and Neumiller, Phillip J., 4,883,540, Cl. 134-1.000.
Neurosonics, Inc.: *See*—
Knispel, Joel; and Wright, Geoffrey, 4,883,067, Cl. 128-732.000.
New Jersey Institute of Technology: *See*—
Konon, Walter, 4,883,589, Cl. 210-140.000.
New York University: *See*—
Gitel, Sanford N.; and Wessler, Stanford, 4,883,751, Cl. 435-7.000.
Newkirk, David D., to James River Corporation. High loft nonwoven fabricml4,883,707, Cl. 428-219.000.
Ngai, Chuck H.; and Watkins, Gerald J., to International Business Machines Corp. High performance parallel vector processor having a modified vector register/element processor configurationml4,884,190, Cl. 364-200.000.
NGK Insulators, Ltd.: *See*—
Murase, Takao; and Yoshimura, Tsunenori, 4,883,947, Cl. 219-553.000.
Ozaki, Sei; Inoue, Satoru; and Futamura, Shoji, 4,883,420, Cl. 425-464.000.
Watanabe, Keiichiro; and Ohashi, Tsuneaki, 4,883,781, Cl. 501-102.000.
NGK Spark Plug Co., Ltd.: *See*—
Ichie, Tsugumi; and Ando, Minoru, 4,882,925, Cl. 72-356.000.
Miyata, Shigeru; and Sawada, Toshiki, 4,884,066, Cl. 340-633.000.
Nishio, Hisaharu; and Okumura, Toshio, 4,883,643, Cl. 422-94.000.
Nguyen, Dat: *See*—
Sansevero, Frank M.; Seehausen, Klaus; Rivera, James A.; Nguyen, Dat; and Borchers, Peter, 4,883,160, Cl. 198-328.000.
Nichols, William T.: *See*—
Meehan, Kermit E.; Nichols, William T.; Meehan, Timothy S.; and Essig, Robert A., 4,882,910, Cl. 62-256.000.
Nicholson, Warren B., to Medex, Inc. Temperture and pressure monitors utilizing interference filtersml4,883,062, Cl. 128-667.000.
Nichtweiss, Bernd: *See*—
Sattler, Hans-Peter; and Nichtweiss, Bernd, 4,883,584, Cl. 209-38.000.
Nicolay, David, to Picker International, Inc. X-ray television imaging using digital circular blankingml4,884,291, Cl. 378-99.000.
Nicollini, Germano: *See*—
Confalonieri, Pierangelo; Pernici, Sergio; and Nicollini, Germano, 4,883,993, Cl. 307-542.100.
Niedermeyer, William: *See*—
Bellis, Kenneth E.; Brown, Jackson E.; Nagarwalla, Pheroze J.; Niedermeyer, William; and Pawlak, Paul, 4,883,558, Cl. 156-292.000.
Niedospial, John J., Jr., to Eastman Kodak Company. Film cassettem14,883,235, Cl. 242-71.100.
Niedospial, John J., Jr.; and Fairman, Patricia D., to Eastman Kodak Company. Film cassettem14,883,236, Cl. 242-71.100.
Nielsen, Inge, to I.K. Trading Aps. Central heating system and water system and method for controlling the tightness thereofml4,883,087, Cl. 137-458.000.
Nifco, Inc.: *See*—
Mushya. Takashi, 4,883,382, Cl. 403-405.100.
Niggemann, Richard E.: *See*—
Dobbs, Bradley A.; Wigmore, David B.; and Niggemann, Richard E., 4,883,117, Cl. 165-164.000.
Nihon Dimple Carton Co., Ltd.: *See*—
Kato, Eiji; Kuboshima, Katsumi; and Kaneko, Tomoyuki, 4,883,196, Cl. 220-415.000.
Nikken Chemicals Company, Limited: *See*—
Kondou, Tsutomu, 4,883,685, Cl. 426-658.000.
Nikon Corporation: *See*—
Anzai, Satoru; and Tanaka, Hiroshi, 4,883,345, Cl. 350-418.000.
Tanimoto, Akikazu, 4,884,101, Cl. 355-68.000.
Nikura, Hideo, to Sony Corporation. Linear motorml4,883,994, Cl. 310-12.000.
Nilsen, Morten N. Arrangement in a purse or bag secured against theftml4,882,815, Cl. 24-303.000.
Nilsson, Jan: *See*—
Adlerborn, Jan; Larker, Hans; and Nilsson, Jan, 4,883,639, Cl. 419-49.000.
Ninomiya, Kunihiro; Saito, Ken-Ichi; Morita, Shuji; Tobe, Akihiro; and Nitta, Issei, to Mitsubishi Kasei Corporation. 4-piperidinecarboxamide derivativesml4,883,802, Cl. 514-278.000.
Ninomiya, Yuichi; Ohtsuka, Yoshimichi; Izumi, Yoshinori; Gohshi, Seiichi; and Shishikui, Yoshiaki, to Nippon Hoso Kyokai. Motion detection circuitml4,884,136, Cl. 358-105.000.
Nippon Air Brake Co., Ltd.: *See*—
Tamamori, Hideo, 4,883,089, Cl. 137-596.180.
Nippon Electric Glass Company, Limited: *See*—
Yamanaka, Toshio, 4,883,777, Cl. 501-15.000.
Nippon Gohsei Kaguku Kogyo Kabushikis Kaisha: *See*—
Iwanami, Teruo; Moriyama, Takamasa; and Asano, Kuniyoshi, 4,883,696, Cl. 428-35.400.
Nippon Hoso Kyokai: *See*—
Ninomiya, Yuichi; Ohtsuka, Yoshimichi; Izumi, Yoshinori; Gohshi, Seiichi; and Shishikui, Yoshiaki, 4,884,136, Cl. 358-105.000.
Ogawa, Hirofumi; Sameshima, Kenji; Hirai, Tadaaki; Unnai, Takaaki; Yamamoto, Masanao; Shidara, Keiichi; Yamazaki, Junichi; Hiruma, Eikiyu; and Suzuki, Shirou, 4,883,562, Cl. 156-643.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Kuwamoto, Hiroshi; Iwado, Shuichi; Koga, Yoichi; Izushi, Tomoya; Muto, Toshimi; and Kuroi, Nobuomi, 4,883,606, Cl. 252-32.500.
Nippon Oil and Fats Co., Ltd.: *See*—
Masuoka, Shigeru; and Doi, Hiroshi, 4,883,852, Cl. 526-279.000.
Takemoto, Masayuki; Nagura, Osamu; Nomura, Yukio; and Yasuda, Minoru, 4,883,858, Cl. 528-322.000.
Yamamoto, Shosaku; Kakinuma, Kazuo; Sodeyama, Fumio; Mayumi, Junji; and Maruta, Riichiro, 4,883,834, Cl. 524-504.000.
Nippon Paint Co., Ltd.: *See*—
Muramoto, Hisaichi; Ishii, Keizou; and Miyazono, Tadafumi, 4,883,899, Cl. 560-14.000.
Nippon Seimitsu Kogyo Kabushiki Kaisha: *See*—
Nakagomi, Kazuhito, 4,884,091, Cl. 354-271.100.
Nippon Steel Corporation: *See*—
Ichida, Kozaburo; Yamaguchi, Susumu; and Chikazawa, Bunichiro, 4,882,923, Cl. 72-249.000.
Ueda, Masanori; Abe, Masayuki; Shitani, Kensai; Yoshimoto, Tetsuo; Yamamoto, Hiroki; and Kurosawa, Fumio, 4,883,544, Cl. 148-2.000.
Nippon Telegraph and Telephone Corporation: *See*—
Hipple, James E.; Dionne, Gerald L.; Torii, Yasuhiro; Shimada, Masaru; and Watanabe, Iwao, 4,883,968, Cl. 250-423.00R.
Nippon Zeon Co., Ltd.: *See*—
Hamaguchi, Tetsuo; Ueda, Tsunehisa; and Natsuume, Tadao, 4,883,535, Cl. 106-93.000.
Nippondenso Co., Ltd.: *See*—
Hosoe, Katsuharu; Itoh, Teruyoshi; Tachi, Ryosuke; and Nojiri, Takao, 4,883,033, Cl. 123-335.000.
Niro Atomizer Inc.: *See*—
Hansen, Ove, 4,883,004, Cl. 110-343.000.
Nishi, Masanori: *See*—
Kimura, Kaoru; Nishi, Masanori; and Minami, Yoshikatsu, 4,884,189, Cl. 364-474.310.
Nishida, Tsuyoshi: *See*—
Ito, Ryoichi; Iwai, Koji; Nishida, Tsuyoshi; and Kimura, Junji, 4,883,024, Cl. 123-41.700.
Nishihara, Minoru: *See*—
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.
Nishikawa, Hiroaki: *See*—
Terada, Hiroaki; Asada, Katsuhiko; Nishikawa, Hiroaki; Miyata, Souichi; Asano, Hajime; Shimizu, Masahisa; Shima, Kenji; and Komori, Shinji, 4,884,192, Cl. 364-200.000.
Nishimoto, Hiroshi; Touge, Takashi; Okiyama, Tadashi; Kuwata, Naoki; and Arai, Yasunari, to Fujitsu Limited. Semiconductor laser modulation control systemml4,884,278, Cl. 372-26.000.
Nishimoto, Yoshiharu: *See*—
Ohya, Masaki; and Nishimoto, Yoshiharu, 4,883,693, Cl. 428-34.900.
Nishimura, Hiroshi; and Tanaka, Satoshi, to Kabushiki Kaisha Toshiba. Circular tube shaping apparatusml4,883,529, Cl. 65-281.000.
Nishimura, Yukinobu: *See*—
Shimomura, Setsuhiro; and Nishimura, Yukinobu, 4,883,035, Cl. 123-361.000.
Nishinbe, Takashi: *See*—
Yokoyama, Shotaro; and Nishinbe, Takashi, 4,883,951, Cl. 250-201.000.
Nishino, Toshikazu; Miyake, Mutsuko; Kawabe, Ushio; Harada, Yutaka; Aoki, Masaaki; and Hirano, Mikio. Superconducting devicem14,884,111, Cl. 357-05.000.
Nishio, Hisaharu; and Okumura, Toshio, to NGK Spark Plug Co., Ltd. Oxygen sensor protected against contaminantsml4,883,643, Cl. 422-94.000.
Nishioka, Takashi: *See*—
Fujitani, Takashi; Uemura, Hiromi; Kishimoto, Toshiaki; Uchiyama, Masayuki; Shirasu, Isao; Kurokawa, Hideyuki; Nishioka, Takashi; Kikukawa, Kenji; and Sato, Yoshinori, 4,883,185, Cl. 212-147.000.
Nishiyama, Kiyoto: *See*—
Eda, Yasuyuki; Maeda, Toshihiro; Nishiyama, Kiyoto; and Tashiro, Akira, 4,883,752, Cl. 435-68.000.
Nissan Motor Co., Ltd.: *See*—
Miyazaki, Kenichi; Nakamura, Katsumi; and Hagiwara, Taro, 4,883,309, Cl. 296-194.000.
Miyazaki, Kenichi; and Morigaki, Tadahiko, 4,883,310, Cl. 296-210.000.
Murakami, Takuya; Kato, Yoichiro; and Terauchi, Kenji, 4,883,287, Cl. 280-665.000.
Nissen, Steven L., to Iowa State University Research Foundation, Inc. Raising chickens for meat production with ketoisocaproate-containing feedsml4,883,817, Cl. 514-557.000.
Nitschke, Norman C.: *See*—
McMaster, Harold A.; Nitschke, Norman C.; McMaster, Dexter H.; and McMaster, Ronald A., 4,883,527, Cl. 65-273.000.
Nitta, Issei: *See*—
Ninomiya, Kunihiro; Saito, Ken-Ichi; Morita, Shuji; Tobe, Akihiro; and Nitta, Issei, 4,883,802, Cl. 514-278.000.
Nitto Boseki Co., Ltd.: *See*—
Abe, Yoshihito; Yaginuma, Katsuhiro; Nagasawa, Takeshi; and Kuroiwa, Katsumasa, 4,883,863, Cl. 530-331.000.

Nitto Chemical Industry Co., Ltd.: *See*—
Kiyomiya, Yutaka; Yamaguchi, Yasumasa; Ushigome, Masahiro; and Murata, Hiroshi, 4,883,897, Cl. 558-327.000.
Niu, Joseph H. Y.: *See*—
Roling, Paul V.; and Niu, Joseph H. Y., 4,883,580, Cl. 208-48.0AA.
Niwa, Koichi: *See*—
Taniuchi, Akira; Komori, Hirohito; and Niwa, Koichi, 4,883,843, Cl. 525-327.600.
Niwa, Takashi: *See*—
Shinohara, Kenji; Niwa, Takashi; and Wakatsuki, Yoshihiro, 4,883,929, Cl. 200-5.00R.
Nixon, Robert H.: *See*—
Johnston, Alan R.; Nixon, Robert H.; Bergman, Larry A.; and Esener, Sadik, 4,884,243, Cl. 365-234.000.
Nobile, John R., to Pitney Bowes Inc. Mailing machine including improved sheet aligning meansml4,882,989, Cl. 101-235.000.
Noda, Akitaka: *See*—
Azukizawa, Teruo; Morishita, Mimpei; Yokoyama, Toyohiko; Takaki, Shigeo; Yuyama, Yoshio; and Noda, Akitaka, 4,882,999, Cl. 104-281.000.
Noda, Masayuki: *See*—
Kariya, Kenichi; Noda, Masayuki; Yamaguchi, Takahiro; and Takahashi, Katsuji, 4,883,708, Cl. 428-263.000.
Noiles, Douglas G.: *See*—
Mallory, Thomas H.; McTighe, Timothy; and Noiles, Douglas G., 4,883,491, Cl. 623-22.000.
Noirjean, Pierre-Andre , to ETA SA Fabriques d'Ebauches. Miniature table clockml4,884,258, Cl. 368-276.000.
Nojiri, Takao: *See*—
Hosoe, Katsuharu; Itoh, Teruyoshi; Tachi, Ryosuke; and Nojiri, Takao, 4,883,033, Cl. 123-335.000.
Noke, Adrian C.: *See*—
Jowitt, Frederick W.; Harrison, Robert H.; and Noke, Adrian C., 4,883,578, Cl. 204-300.0EC.
Nomad Structures International, Ltd.: *See*—
Browne, Antony N., 4,882,884, Cl. 52-82.000.
Nomura, Akihiro: *See*—
Matsui, Kunio; Fukase, Hisahiko; Hirata, Atsushi; and Nomura, Akihiro, 4,883,113, Cl. 164-428.000.
Nomura, Yukio: *See*—
Takemoto, Masayuki; Nagura, Osamu; Nomura, Yukio; and Yasuda, Minoru, 4,883,858, Cl. 528-322.000.
Noranda, Inc.: *See*—
Kitzinger, Frank; Sprott, David; and Menard, Michel, 4,884,250, Cl. 367-180.000.
Nordholm, Ken; and Eyers, Bud, to Talkie Tooter (Canada) Ltd. Motion and position sensing alarmml4,884,067, Cl. 340-686.000.
Nordica S.p.A.: *See*—
Sartor, Mariano; and Tonel, Valerio, 4,882,857, Cl. 36-120.000.
Nordson Corporation: *See*—
Miller, Scott R.; and Dunn, Robert A., 4,883,200, Cl. 222-77.000.
Norprint International Limited: *See*—
Holmes, Peter G.; Lowe, Michael; and Donaghue, Christopher, 4,882,861, Cl. 40-299.000.
Nortgate Research, Inc.: *See*—
Urman, Robert; Brisson, Alfred G.; and Nowacki, Cristopher, 4,883,050, Cl. 128-202.270.
North American Specialties Corporation: *See*—
Seidler, Jack, 4,883,435, Cl. 439-876.000.
North Carolina State University: *See*—
Klaenhammer, Todd R.; and Sanozky-Dawes, Rosemary B., 4,883,756, Cl. 435-252.300.
North Central Plastics, Incorporated: *See*—
Langlie, Ronald H.; and Berg, Jon A., 4,883,923, Cl. 174-158.00F.
Noser, Friedrich: *See*—
Hanefeld, Wolfgang; Rothlisberger, Rudi; and Noser, Friedrich, 4,883,652, Cl. 424-59.000.
Nourry, Patrick; Husser, Jacques; and Thoulon, Pierre-Yves, to Hewlett-Packard Company. Method and apparatus for encoding and decoding binary informationml4,884,074, Cl. 341-70.000.
Novak, Bruce M.: *See*—
Grubbs, Robert H.; and Novak, Bruce M., 4,883,851, Cl. 526-268.000.
Novak, Mark E.: *See*—
Nagy, Gabor S.; Akeson, Richard C.; Sweenie, Richard E.; Novak, Mark E.; Malsch, Harry K.; Widule, Thomas J.; Ding, Gustav L. P.; and Jackson, Jared K., 4,882,930, Cl. 73-56.000.
NovaSensor: *See*—
Petersen, Kurt E.; and Barth, Phillip W., 4,882,933, Cl. 73-517.00R.
Novikov, Alexei E.: *See*—
Kozlov, Valery S.; Polyakova, Elena A.; Novikov, Alexei E.; and Krupko, Mikhail T., 4,884,028, Cl. 324-213.000.
Nowacki, Cristopher: *See*—
Urman, Robert; Brisson, Alfred G.; and Nowacki, Cristopher, 4,883,050, Cl. 128-202.270.
Nozaki, Satoshi; Imai, Shigeo; Ishigami, Makoto; and Tomida, Katsushi, to Uni-Charm Corporation. Composite non-woven fabric and process for preparing such non-woven fabricml4,883,709, Cl. 428-288.000.
NSK-Warner K.K.: *See*—
Kinoshita, Yoshio, 4,882,941, Cl. 192-45.100.
Nuclear Assurance Corporation: *See*—
McDaniels, John D., Jr., 4,883,637, Cl. 376-272.000.
N.V. Bekaert S.A.: *See*—
Coppens, Wilfried; Chambaere, Daniel; and Lievens, Hugo, 4,883,722, Cl. 428-625.000.
Oakes, Thomas R.; Pedersen, Daniel E.; and Majewski, Donna M., to Ecolab Inc. Disinfectant polymeric coatings for hard surfacesml4,883,828, Cl. 523-122.000.
Oakland, Dennis N., to O'Brien International, Inc. Kneeboard with retractable finsml4,883,436, Cl. 441-65.000.
Obermann, Peter: *See*—
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O'Brien International, Inc.: *See*—
Oakland, Dennis N., 4,883,436, Cl. 441-65.000.
Oce-Nederland B.V.: *See*—
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O'Connor, James E.; Beever, William H.; Dancer, Jeffrey W.; Beaulieu, William B.; Selby, Larry M.; and Rhodes, Virgil H., Jr., to Phillips Petroleum Company. Pultrusion process and apparatusml4,883,552, Cl. 156-180.000.
Ocular Blood Flow Laboratories, Inc.: *See*—
Langham, Maurice E., 4,883,056, Cl. 128-645.000.
Odagiri, Yuichi, to NEC Corporation. Optical transmission apparatusml4,884,279, Cl. 372-29.000.
Odashima, Hitoshi: *See*—
Hiramatsu, Hiromichi; Odashima, Hitoshi; Hirayama, Kuniaki; and Ohji, Toshio, 4,882,833, Cl. 29-596.000.
Oden, Robert R.: *See*—
Purnell, Mark L.; Oden, Robert R.; McCune, William L.; and Berkeley, Michael E., 4,883,048, Cl. 128-92.0VD.
Oen, Egil O.: *See*—
Henriksen, Henrik M.; and Oen, Egil O., 4,882,995, Cl. 102-371.000.
Oepen, Heinrich A.: *See*—
Eusemann, Roland K.; Oepen, Heinrich A.; and Hammers, Anton, 4,884,002, Cl. 310-323.000.
Ogawa, Hirofumi; Sameshima, Kenji; Hirai, Tadaaki; Unnai, Takaaki; Yamamoto, Masanao; Shidara, Keiichi; Yamazaki, Junichi; Hiruma, Eikiyu; and Suzuki, Shirou, to Hitachi, Ltd.; and Nippon Hoso Kyokai. Method of making a photosensorml4,883,562, Cl. 156-643.000.
Ogawa, Hiroshi; and Yoshida, Susumu, to Kabushiki Kaisha Meidensha. Programmable driverless vehicleml4,884,202, Cl. 364-424.010.
Ogawa, Hiroyasu; Kogo, Yasuo; Takahashi, Shuji; and Suzuki, Yasuo, to Toho Rayon Co., Ltd.; and Yokohama Rubber Co., Ltd., The. Carbon fiber cord for rubber reinforcementml4,883,712, Cl. 428-367.000.
Ogawara, Kensuke: *See*—
Sato, Masatoshi; Ogawara, Kensuke; and Emura, Noriaki, 4,883,702, Cl. 428-141.000.
Ogden Environmental Services, Inc.: *See*—
Johanson, Niles W.; Saeger, James C.; and White, Mark L., 4,883,115, Cl. 165-1.000.
Ogino, Keizo: *See*—
Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 4,883,596, Cl. 210-638.000.
Oh-hori, Tatsuya: *See*—
Kasai, Kazumi; Itoh, Hiromi; Tanaka, Hitoshi; Oh-hori, Tatsuya; and Komeno, Junji, 4,883,020, Cl. 118-719.000.
Oh, Indong. Acetabular cupml4,883,490, Cl. 623-22.000.
Ohashi, Tsuneaki: *See*—
Watanabe, Keiichiro; and Ohashi, Tsuneaki, 4,883,781, Cl. 501-102.000.
Ohbayashi, Masaru: *See*—
Kamei, Hideo; Ohbayashi, Masaru; Tomita, Koji; Sugawara, Koko; and Konishi, Masataka, 4,883,758, Cl. 435-253.500.
Ohishi, Yoshiaki: *See*—
Chiba, Kazuo; Ohishi, Yoshiaki; Migita, Jituo; Mochizuki, Hajime; and Kobayashi, Takao, 4,883,950, Cl. 235-440.000.
Ohji, Toshio: *See*—
Hiramatsu, Hiromichi; Odashima, Hitoshi; Hirayama, Kuniaki; and Ohji, Toshio, 4,882,833, Cl. 29-596.000.
Ohki, Nobuaki; Sengoku, Norio; and Kobayashi, Fumiyuki, to Hitachi, Ltd. Multilayer printed circuit board and method of producing the sameml4,884,170, Cl. 361-414.000.
Ohmae, Tadayuki: *See*—
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.
Ohmori, Koichi: *See*—
Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Ohtsuchi, Tetsuro; and Watanabe, Masanori, 4,883,967, Cl. 250-370.010.
Ohmura, Hiroshi: *See*—
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,884,087, Cl. 354-75.000.
Ohnishi, Kazumasa: *See*—
Uchino, Kenji; and Ohnishi, Kazumasa, 4,883,248, Cl. 248-550.000.
Ohno, Tadayoshi: *See*—
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; Kanai, Tsutomu; and Matsui, Toshikazu, 4,884,080, Cl. 346-46.000.
Ohno, Tomoyuki: *See*—
Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita,

Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, 4,883,711, Cl. 428-336.000.

Ohshima, Shigeo; and Sahara, Hiroshi, to Kabushiki Kaisha Toshiba. Semiconductor device having reduced potential fluctuationsml4,883,978, Cl. 307-443.000.

Ohta, Masahiro; Kawashima, Saburo; Snobe, Yoshiho; Tamai, Shoji; Oikawa, Hideaki; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Inc. Flexible copper-clad circuit substratem14,883,718, Cl. 428-458.000.

Ohta, Midori, to Kabushiki Kaisya Advance. Material for endermic administration pre-treatmentml4,883,668, Cl. 424-448.000.

Ohtsu, Masamitsu; and Taniguchi, Hiroshi, to Matsushita Electric Industrial Co., Ltd. Recording and/or reproducing apparatus with photo-electric image devicem14,884,151, Cl. 358-330.000.

Ohtsuchi, Tetsuro: *See*—
Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Ohtsuchi, Tetsuro; and Watanabe, Masanori, 4,883,967, Cl. 250-370.010.

Ohtsuka, Yoshimichi: *See*—
Ninomiya, Yuichi; Ohtsuka, Yoshimichi; Izumi, Yoshinori; Gohshi, Seiichi; and Shishikui, Yoshiaki, 4,884,136, Cl. 358-105.000.

Ohura, Masaki: *See*—
Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita, Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, 4,883,711, Cl. 428-336.000.

Ohya, Masaki; and Nishimoto, Yoshiharu, to Kureha Kagaku Kogyo Kabushiki Kaisha. Heat-shrinkable laminate tubular filmml4,883,693, Cl. 428-34.900.

Ohzeki, Kazuhiko: *See*—
Kanno, Masahide; Yabe, Hisao; Yokoi, Takeshi; Yoshinaga, Jun; and Ohzeki, Kazuhiko, 4,884,133, Cl. 358-98.000.

Oikawa, Hideaki: *See*—
Ohta, Masahiro; Kawashima, Saburo; Snobe, Yoshiho; Tamai, Shoji; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,883,718, Cl. 428-458.000.

Oikawa, Toshihiro; Tanai, Tsuneo; Yamada, Noriyuki; Saka, Tsutomu; and Kobayashi, Toshiki, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating system for internal combustion enginesml4,883,027, Cl. 123-90.160.

Okada, Hideaki: *See*—
Yamaoka, Kojiro; Azuma, Toshiro; Fujisaki, Koichiro; and Okada, Hideaki, 4,882,940, Cl. 74-15.66l.

Okada, Kenichi, to Japan Aviation Electronics Industry Limited. Fiber optic gyro stabilized by harmonic components of detected signalml4,883,358, Cl. 356-350.000.

Okada, Masaki: *See*—
Sekiyama, Shigeo; and Okada, Masaki, 4,882,906, Cl. 60-624.000.

Okada, Mitsuyuki: *See*—
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.

Okada, Shinjiro; Yoshinaga, Kazuo; Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Hanyu, Yukio; Yamashita, Masataka; and Katagiri, Kazuharu, to Canon Kabushiki Kaisha. Liquid crystal device having a modified polyvinyl alcohol alignment layerm14,883,344, Cl. 350-339.00R.

Okada, Yoshihiro: *See*—
Tsuji, Kiyoshi; Kimura, Kenji; and Okada, Yoshihiro, 4,884,134, Cl. 358-98.000.

Okada, Yoshitsugu, to NEC Corporation. Method of manufacturing multi-layered wiring substratem14,882,839, Cl. 29-853.000.

Okamoto, Eisaku; and Komatsu, Ikuo, to Yamaha Corporation. Percussive musical tone generator systemml4,882,964, Cl. 84-611.000.

Okawa, Masayuki: *See*—
Tsujimura, Osamu; Arai, Tatsuo; and Okawa, Masayuki, 4,883,391, Cl. 407-40.000.

Oki Electric Industry Co., Ltd.: *See*—
Ishikawa, Osamu; Sone, Mikihiko; and Suzuki, Yoshimi, 4,884,148, Cl. 358-464.000.
Ito, Toshikazu; Suemune, Toshiro; and Sato, Katsuhiko, 4,884,162, Cl. 361-23.000.
Kimura, Haruo; Ishidate, Takeo; and Goto, Masao, 4,883,183, Cl. 209-534.000.
Ono, Takashi; and Kitazawa, Shooji, 4,884,239, Cl. 365-185.000.

Okiyama, Tadashi: *See*—
Nishimoto, Hiroshi; Touge, Takashi; Okiyama, Tadashi; Kuwata, Naoki; and Arai, Yasunari, 4,884,278, Cl. 372-26.000.

Oku, Teruo: *See*—
Hashimoto, Masashi; Oku, Teruo; Ito, Yoshikuni; Namiki, Takayuki; Sawada, Kozo; Kasahara, Chiyoshi; and Baba, Yukihisa, 4,883,800, Cl. 514-259.000.

Okumura, Takuzo: *See*—
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.

Okumura, Toshio: *See*—
Nishio, Hisaharu; and Okumura, Toshio, 4,883,643, Cl. 422-94.000.

Okuyama, Toshiaki: *See*—
Matsui, Takayuki; Okuyama, Toshiaki; Matsutake, Mitsugu; Takahashi, Junichi; and Ito, Masami, 4,884,184, Cl. 363-46.000.

Okuyama, Yuki: *See*—
Ikeuchi, Satoru; Arai, Mitutaka; Okuyama, Yuki; Yuri, Hideki; Shiohara, Tomoo; and Oyama, Yasuhiko, 4,883,734, Cl. 430-109.000.

Olin Corporation: *See*—
Pennington, B. Timothy, 4,883,889, Cl. 549-532.000.
Raynor, Robert J., 4,883,653, Cl. 424-60.000.
SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., 4,883,778, Cl. 501-19.000.

Olsen, Thomas G.: *See*—
Frost, Johnathan E.; Hsu, Eric T.; Jackson, David M.; Olsen, Thomas G.; and Popp, Robert L., 4,883,549, Cl. 156-161.000.

Olsen, Torodd E., to Haugesund Mekaniske Verksted A/S. Method for constructing huge modules, and a module fabricated by said methodml4,883,389, Cl. 405-204.000.

Olson, Richard J.; and Gust, David C., to EquiMed Corporation. Method and system for gathering electrocardiographic datam14,883,064, Cl. 128-696.000.

Olympus Optical Co., Ltd.: *See*—
Aoki, Norihiko; and Kikuchi, Juro, 4,883,346, Cl. 350-423.000.
Kanno, Masahide; Yabe, Hisao; Yokoi, Takeshi; Yoshinaga, Jun; and Ohzeki, Kazuhiko, 4,884,133, Cl. 358-98.000.
Tsuji, Kiyoshi; Kimura, Kenji; and Okada, Yoshihiro, 4,884,134, Cl. 358-98.000.

Omaki, Takanobu: *See*—
Kitaura, Mashio; Nakai, Masaaki; Yoshida, Tadahiro; Kikukawa, Yoshiiku; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,884,094, Cl. 354-412.000.

O'Malley, Gerard J.: *See*—
Kosley, Raymond W., Jr.; and O'Malley, Gerard J., 4,883,793, Cl. 514-228.200.

Omata, Satoshi: *See*—
Inoue, Hiroshi; Omata, Satoshi; Osada, Yoshiyuki; Inoue, Yutaka; Yamakawa, Tadashi; and Satomura, Hiroshi, 4,884,079, Cl. 346-1.100.

Omron Tateisi Electronics Co.: *See*—
Shinohara, Kenji; Niwa, Takashi; and Wakatsuki, Yoshihiro, 4,883,929, Cl. 200-5.00R.

O'Neall, Donald L.; and Meyer, Kerry L., to O'Neall, Donald L. Guidance system for farm implementsml4,883,128, Cl. 172-430.000.

Ono, Takashi; and Kitazawa, Shooji, to Oki Electric Industry Co., Ltd. Method for erasing data in a semiconductor memory devicem14,884,239, Cl. 365-185.000.

Onodera, Fumio; Uchimi, Hiroshi; and Koseki, Toshio, to Kitanihon Electric Wire Co., Ltd. Manufacturing machine for sagged self-supporting cableml4,883,671, Cl. 425-122.000.

Onodera, Shuji; Sato, Taichi; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Yamada, Yoko; Yamaguchi, Yuzo; Takeuchi, Yoshinori; Hara, Shigeo; and Setone, Shouichi, to Hitachi, Ltd. Flanged transducer supporting arm for a magnetic head/arm assemblyml4,884,154, Cl. 360-104.000.

Onoki, Fumio, to Hoya Corporation. Process for producing laminated ophthalmic lensml4,883,548, Cl. 156-99.000.

Ontario Technologies Corp.: *See*—
Weisert, Edward D.; Fischer, John R.; and McCauley, William L., 4,882,823, Cl. 29-6.100.

Ootsuka, Hiroshi: *See*—
Tanaka, Yoshihiro; Ootsuka, Hiroshi; and Hayama, Koh, 4,884,090, Cl. 354-234.100.

Orion Instruments, Inc.: *See*—
Blakeslee, Thomas R., 4,884,020, Cl. 324-83.00D.

Orlando, Crescenzo; Zenere, Sandro; Butera, Antonio; and Beghetto, Leonardo, to Saipem S.p.A.; Snamprogetti S.p.A.; Spea S.p.A.; and Tecnomare S.p.A. Method and device for underwater modular crossing constructionml4,883,386, Cl. 405-136.000.

Ortho Pharmaceutical Corporation: *See*—
Conley, Richard A.; and Barton, Donald L., 4,883,787, Cl. 564-414.000.

Ortiz, Jose A.: *See*—
Foguet, Rafael; Ortiz, Jose A.; Gubert, Santiago; Raga, Manuel M.; and Sacristan, Aurelio, 4,883,797, Cl. 514-255.000.

Ortofon Manufacturing A/S: *See*—
Larsen, Jan; Gudmandsen, Robert; and Winfeld, Per, 4,884,262, Cl. 369-136.000.

Orvis Company, Inc., The: *See*—
Harder, John R., 4,883,238, Cl. 242-317.000.

Orwig, Gary W.: *See*—
Matheny, Stephen E.; and Orwig, Gary W., 4,884,068, Cl. 340-707.000.

Osada, Yoshiyuki: *See*—
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Osborne, Gary L.: *See*—
Saelens, William R.; and Osborne, Gary L., 4,883,205, Cl. 224-32.00R.

Oshima, Hiroshi; Sadakane, Hirofumi; Katayama, Takao; Takakura, Jinnosuke; and Fujioka, Hisatake, to Kubota, Ltd. Clutch control structure for a walking operator type lawn mowerml4,882,897, Cl. 56-11.300.

Ostholt, Rudiger; Wahrmann, Jorg; and Becker, Klaus, to Lohmann Anlagenbau GmbH. Apparatus for removing meat from a bone of a poultry limb or the likeml4,882,810, Cl. 17-11.000.

Otawa, Taro: *See*—
Goto, Fumio; and Otawa, Taro, 4,883,632, Cl. 264-544.000.

Otis Elevator Company: *See*—
Sansevero, Frank M.; Seehausen, Klaus; Rivera, James A.; Nguyen, Dat; and Borchers, Peter, 4,883,160, Cl. 198-328.000.

Otis, Roger W.; and Otis, Stephen H. Marinaml4,883,014, Cl. 114-263.000.

Otis, Stephen H.: *See—*
Otis, Roger W.; and Otis, Stephen H., 4,883,014, Cl. 114-263.000.
Otsuka, Issei: *See—*
Nakamoto, Kouji; Suzuki, Takeshi; Abe, Shinya; Hayashi, Kenji; Kajiwara, Akiharu; Yamatsu, Isao; Otsuka, Issei; and Shiojiri, Hiroyuki, 4,883,916, Cl. 564-186.000.
Ott, Edward L.; Conway, Timothy F.; and Kubala, Thomas S., to Restaurant Technology, Inc. Pizza containerml4,883,195, Cl. 220-339.000.
Ottar, Brynjulf: *See—*
Rey, Louis; Ottar, Brynjulf; and Lafon, Louis, 4,883,507, Cl. 55-97.000.
Ouarve, Vernon K.; and McCormick, Dennis L., to Graco Inc. Fluid dispensing deviceml4,883,199, Cl. 222-14.000.
Outboard Marine Corporation: *See—*
Winston, John H., 4,883,029, Cl. 123-193.00P.
Overath, Friedhelm; and Weyer, Michael, to Georg Fischer AG. Method of manufacturing fiber-reinforced articles or plastics materialml4,883,550, Cl. 156-171.000.
Ovshinsky, Stanford R.: *See—*
Doehler, Joachim; Hudgens, Stephen J.; Ovshinsky, Stanford R.; Dotter II, Buddie; Peedin, Lester R.; Krisko, Jeffrey M.; and Krisko, Annette, 4,883,686, Cl. 427-38.000.
Owens-Corning Fiberglas Corporation: *See—*
Carter, Neil A., 4,883,690, Cl. 427-430.100.
Owens-Illinois Plastic Products Inc.: *See—*
Ajmera, Prakash R., 4,883,631, Cl. 264-528.000.
Oy Nokia AB: *See—*
Seppanen, Reijo O., 4,883,595, Cl. 210-634.000.
Oyama, Jun; and Uchida, Naoshi, to Fuji Electric Co., Ltd. Circuit breaker overcurrent tripping deviceml4,884,049, Cl. 337-36.000.
Oyama, Tsukasa: *See—*
Takuma, Keisuke; Kuroda, Sizuo; Oyama, Tsukasa; and Aiga, Hiroshi, 4,883,611, Cl. 552-235.000.
Oyama, Yasuhiko: *See—*
Ikeuchi, Satoru; Arai, Mitutaka; Okuyama, Yuki; Yuri, Hideki; Shiohara, Tomoo; and Oyama, Yasuhiko, 4,883,734, Cl. 430-109.000.
Ozaki, Sei; Inoue, Satoru; and Futamura, Shoji, to NGK Insulators, Ltd. Die for extruding honeycomb structural bodiesml4,883,420, Cl. 425-464.000.
Ozawa, Kunitaka: *See—*
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Ozawa, Masakazu; Ozawa, Kunitaka; Hatanaka, Katsunori; Suzuki, Tetsuo; Mori, Tetsuzo; Shiina, Tadashi; and Ebinuna, Ryuichi, to Canon Kabushiki Kaisha. Recorder having record medium feed and press rollers and lockable means for urging the press rollers to and from the feed rollerml4,884,085, Cl. 346-136.000.
Ozawa, Naoki; Akiyama, Toshiyuki; Takahashi, Kenji; Mimura, Itaru; and Nakano, Takahiro, to Hitachi, Ltd. Signal processing apparatus for use with a single chip solid-state color cameraml4,884,129, Cl. 358-44.000.
Pac-Tec, Inc.: *See—*
Hedgewick, Peter, 4,883,384, Cl. 404-14.000.
Pace Industries, Inc.: *See—*
Palka, James J.; and Rekart, Robert B., 4,884,176, Cl. 362-135.000.
Pacesetter Infusion, Ltd.: *See—*
Crouse, Ronald J.; Lauer, Norris A.; and Pinto, David A., 4,884,065, Cl. 340-632.000.
Pacific Scientific Company: *See—*
Hendershot, James R., 4,883,999, Cl. 310-254.000.
Page, Catherine J., to Du Pont de Nemours, E. I., and Company. X-ray intensifying screens containing activated rare earth boratesml4,883,970, Cl. 250-483.100.
PAGENDARM Beschichtungstechnik GmbH: *See—*
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Pak, Charles Y. C.; Uskokovic, Milan R.; and Zerwekh, Joseph E., to Board of Regents, The University of Texas System; and Hoffman-LaRoche, Inc. 25S,26-dihydroxycholecalciferol in the treatment of hypercalcitriolemic disease statesml4,883,791, Cl. 514-167.000.
Palka, James J.; and Rekart, Robert B., to Pace Industries, Inc. Tri-view mirrored cabinet with peripheral lightingml4,884,176, Cl. 362-135.000.
Palmieri, Joseph M.: *See—*
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Palo, Robert A.: *See—*
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Pang, Roland H.: *See—*
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Papp, David J. Adjustable floor drain apparatusml4,883,590, Cl. 210-164.000.
Papst Motoren KG: *See—*
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Parce, John W.: *See—*
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Park, George B.: *See—*
McLoughlin, Robert H.; Park, George B.; Cook, John; and Myers, Stephen E., 4,882,828, Cl. 29-623.100.
Park, Jong B., to Goldstar Co., Ltd. Vignetting compensating circuit for a video cameraml4,884,140, Cl. 358-168.000.
Parker, Edward: *See—*
Parker, Jeffery L.; and Parker, Edward, 4,884,214, Cl. 364-505.000.
Parker Electronics, Inc.: *See—*
Parker, Jeffery L.; and Parker, Edward, 4,884,214, Cl. 364-505.000.
Parker, Jeffery L.; and Parker, Edward, to Parker Electronics, Inc. Thermostatml4,884,214, Cl. 364-505.000.
Parlier, Mathew H.: *See—*
Austin, George K., Jr.; and Parlier, Mathew H., 4,883,316, Cl. 297-191.000.
Parma Oy: *See—*
Tomminen, Hannu, 4,883,416, Cl. 425-64.000.
Parodi, Sandro: *See—*
Pontoglio, Enrico; Parodi, Sandro; and Caretti, Giancarlo, 4,883,895, Cl. 358-308.000.
Pontoglio, Enrico; Parodi, Sandro; and Caretti, Giancarlo, 4,883,894, Cl. 358-311.000.
Pasqualucci, Joseph: *See—*
Jackson, Edward; and Pasqualucci, Joseph, 4,884,013, Cl. 318-481.000.
Pasquarella, Stephen T., to VA Inc. Constant current actuator for inductive loadml4,884,160, Cl. 361-18.000.
Pastina, John A.: *See—*
MacKinnon, Francis X.; Horn, James F.; and Pastina, John A., 4,882,820, Cl. 26-93.000.
Pastrick, John J., to Mr. Coffee, Inc. Appliance for brewing coffee/-teaml4,882,983, Cl. 99-295.000.
Patel, Jayant K. Expandable lens replacementml4,883,485, Cl. 623-6.000.
Path: *See—*
Thomas, Ronny D., 4,883,473, Cl. 604-217.000.
Patron, Christian S. A. E.; Sowinski, Eugene J.; and Huben, Aart P., to U.S. Philips Corporation. High-frequency generatorml4,884,043, Cl. 331-186.000.
Patsfall, Ralph E., to General Electric Company. Method for bonding an article projectionml4,883,216, Cl. 228-119.000.
Patterson, Wesley L.: *See—*
Flannery, Gene; Crouse, T. Blair; and Patterson, Wesley L., 4,883,329, Cl. 312-1.000.
Paul Wurth S.A.: *See—*
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Paulson, James E.: *See—*
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Pawlak, Paul: *See—*
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Pawlowski, Walter P.: *See—*
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Payer, Wolfgang: *See—*
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PBS Building Systems, Inc.: *See—*
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Pearson, Marilyn M.: *See—*
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Pease Industries, Inc.: *See—*
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Pedersen, Daniel E.: *See—*
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Pee Patch, Inc.: *See—*
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Peedin, Lester R.: *See—*
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Peillex, Jean-Paul: *See—*
Belaich, Jean-Pierre; Fardeau, Marie-Laure; Peillex, Jean-Paul; and Pavia, Andre , 4,883,753, Cl. 435-167.000.
Peled, Emanuel; Brand, Mordechai; Elster, Esther; Kimel, Josef; and Cohen, Ronen. Multi-cell batteryml4,883,726, Cl. 424-120.000.
Pennington, B. Timothy, to Olin Corporation. Alkylene oxides production using molten nitrate salt catalyst and a co-catalystml4,883,889, Cl. 549-532.000.
Penven, Patrick H., to Asten Group, Inc. Seam design for seamed feltsml4,883,096, Cl. 139-383.00A.
Perevuznik, Josef; Spinnler, Fritz; and Weber, Jurg, to BBC Brown Boveri AG. Rotary spiral piston displacement machine having a silicon rubber biased sealml4,883,413, Cl. 418-55.000.
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Perkin-Elmer Corporation, The: *See—*
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Perkins, Gerald S.: *See—*
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Perlman, Daniel, to Brandeis University. Hydrophobic membrane for drying gel matricesml4,883,597, Cl. 210-640.000.
Perlman, Daniel, to Brandeis University. Microtube vortexer adapter and method of its useml4,883,644, Cl. 422-104.000.
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Audry, Richard; Krempf, Gerard; and Perono, Jackie, 4,883,859, Cl. 528-484.000.
Perry, John H., Jr.; Bhatt, Bharat K.; Capps, Jesse; Eldridge, Paul M.; Greiner, Leonard; Lockyer, Robert W.; Martin, Michelle; McNeice, Raymond R.; Misiaszek, Steven M.; Perry, Stanton S.; Sullivan, Thomas F.; and Campbell, Paul G., to Perry Oceanographics, Inc. Self-contained renewable energy systemml4,883,823, Cl. 518-702.000.
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Personal Pet Products Partnership: *See—*
Ducharme, Cyril L.; Eickhof, Ralph C.; Heider, David A.; Neiberger, Denny W.; and Maass, Fred, 4,883,021, Cl. 119-1.000.
Pertzsch, Albert; Brunner, Hubert; and Zeroni, Ludwig, to Agfa-Gevaert Aktiengesellschaft. Magnetic tape cassette having a spring-biased front panel and locking memberml4,884,158, Cl. 360-132.000.
Pesque, Patrick R.; and Bonnefous, Odile M. A., to U.S. Philips Corporation. Device for eliminating fixed echoes for an ultrasonic echographml4,883,060, Cl. 128-660.010.
Peter, David A.: *See—*
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Petersen, Kurt E.; and Barth, Phillip W., to NovaSensor. Accelerometer with integral bidirectional shock protection and controllable viscous dampingml4,882,933, Cl. 73-517.00R.
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Szirt nee Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Jakfalvi, Elemer; Zukovics nee Sumeg, Katalin; Gado, Klara; and Hegedus, Maria, to EGIS Gyogyszergyar. Pharmaceutical compositionsml4,883,798, Cl. 514-256.000.
Petri, Alberto, to Enichem Tecnoresine, S.p.A. Flame-resistant polycarbonates, containing in their polymeric chain units deriving from mono-halogenated tetra-phenyl compoundsml4,883,856, Cl. 528-202.000.
Petriello, John V.: *See—*
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Petrocarb, Inc.: *See—*
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Petroleum Fermentations N.V.: *See—*
Gutnick, David L.; Nestaas, Eirik; Rosenberg, Eugene; and Sar, Nechemia, 4,883,757, Cl. 435-252.100.
Petroline Wireline Services Limited: *See—*
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Pflaumer, Michael W., to Sun Microsystems, Inc. Variable speed local area networkml4,884,266, Cl. 370-84.000.
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Phelan, Giana M.: *See—*
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Philipp, Leo; Thuer, Ernst; and Ehmig, Gerhard, to Hilti Aktiengesellschaft. Explosive powder charge operated fastening element setting deviceml4,883,211, Cl. 227-9.000.
Philipp, Leo, to Hilti Aktiengesellschaft. Explosive powder charge operated setting deviceml4,883,212, Cl. 227-9.000.
Phillips Petroleum Company: *See—*
Bresson, Clarence R.; and Louthan, Rector P., 4,883,585, Cl. 209-166.000.
Hopkins, Thomas R., 4,883,759, Cl. 435-289.000.
O'Connor, James E.; Beever, William H.; Dancer, Jeffrey W.; Beaulieu, William B.; Selby, Larry M.; and Rhodes, Virgil H., Jr., 4,883,552, Cl. 156-180.000.
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Kay, Nathan; McNab, Donald; and Moya, Edward, 4,883,204, Cl. 222-192.000.
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McLeod, Paul C., 4,883,069, Cl. 128-782.000.
Picciolo, John J.: *See—*
Claar, Terry D.; Busch, Donald E.; and Picciolo, John J., 4,883,497, Cl. 29-623.500.
Picker International, Inc.: *See—*
Nicolay, David, 4,884,291, Cl. 378-99.000.
Sattin, William, 4,884,029, Cl. 324-309.000.
Pickhard, Ewald; and Knogler, Wolfgang. Intravaginal deviceml4,883,071, Cl. 128-837.000.
Pieniak, Heinz A.: *See—*
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Pienta, David J., to Automatic Handling, Inc. Dual station wrapping machineml4,882,892, Cl. 53-176.000.
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Pifer, George C.: *See—*
Gray, Peter V.; Baliga, Bantval J.; Chang, Mike F. S.; and Pifer, George C., 4,883,767, Cl. 437-41.000.
Pillon, Francis D.; and Andriot-Ballet, Michel A. Device inter alia for uniformly distributing solid and/or liquid particles, and an assembly comprising such a deviceml4,883,363, Cl. 366-157.000.
Pinto, David A.: *See—*
Crouse, Ronald J.; Lauer, Norris A.; and Pinto, David A., 4,884,065, Cl. 340-632.000.
Pioneer Electronic Corporation: *See—*
Kanda, Masao, 4,884,150, Cl. 358-327.000.
Pipon, Yves; and Chales, Bernard, to A&M Cousin. Backlash-free reducing mechanism, particularly usable for setting various parts of a seat of an automobile vehicleml4,882,943, Cl. 74-409.000.
Pirelli Coordinamento Pneumatici S.p.A.: *See—*
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Pirkle, Fred L. Temperature-responsive valveml4,883,082, Cl. 137-62.000.
Piron, Jean P.; and Daugan, Jean C., to Colgate-Palmolive Company. Absorbent napkin, particularly for infant's diaper padsml4,883,479, Cl. 604-365.000.
Piscetta, Armando. Multiple function combined weaponml4,882,973, Cl. 89-1.410.
Pisciotti, Trudy; and Healy, Dennis, to Prentice Hall, Inc. Bookml4,883,381, Cl. 402-74.000.
Pitney Bowes Inc.: *See—*
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Plaga, Kurt: *See—*
Blumenthal, Gunter; Kunzer, Heinz; and Plaga, Kurt, 4,883,322, Cl. 299-34.000.
Platen, Martin: *See—*
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Plessey Overseas Limited: *See—*
Goddard, John; and Taylor, Peter, 4,883,410, Cl. 417-69.000.
Kirk, Richard A.; Lee, Peter R.; Hart, Peter B.; Chilton, George A. A.; and Cobb, Alan J., 4,884,086, Cl. 346-155.000.
Ploog, Uwe: *See—*
Veitenhansl, Rudolf; Waltenberger, Peter; Lange, Fritz; Uphues, Guenter; and Ploog, Uwe, 4,883,604, Cl. 252-8.900.
Plume, Steven H.: *See—*
Terpstra, Daniel A.; and Plume, Steven H., 4,882,962, Cl. 83-812.000.
Plundrich, Winfried: *See—*
Ahne, Hellmut; and Plundrich, Winfried, 4,883,730, Cl. 430-18.000.
Pohl, Daniel P.: *See—*
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Poindexter, Gary M.: *See—*
Moore, Eugene R.; Dalke, Brian D.; Malanga, Michael T.; and Poindexter, Gary M., 4,883,846, Cl. 526-73.000.
Polaroid Corporation: *See—*
Mauchan, Donald E., 4,884,088, Cl. 354-86.000.
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Bierman, Laurence W.; Polinsky, Samuel M.; and Humberger, Roger B., 4,883,586, Cl. 209-167.000.
Poloni, Alfredo: *See—*
Drigani, Fausto; and Poloni, Alfredo, 4,883,372, Cl. 384-585.000.

Polyakova, Elena A.: *See—*
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Polyco, Inc.: *See—*
Van der Woude, Gerbrig W.; and Moore, Timothy M., 4,883,394, Cl. 411-51.000.

Pommier, Daniel, to Etat Francais, Represente Par Le Secretariat D'etat Aux Post Es Et Telecommunications (Centre National D'etudes Des Telecommunications). Method of digital sound broadcasting in television channels with spectrum interlacingml4,884,139, Cl. 358-142.000.

Ponticello, Gerald S.: *See—*
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Pontius, Klaus; and Settinger, Manfred, to Klockner Ferromatik Desma GmbH. Device for preparing and ejecting a chemically reacting mixturem14,883,645, Cl. 422-133.000.

Pontoglio, Enrico; Parodi, Sandro; and Caretti, Giancarlo, to Caffaro s.p.a. Societa per l'Industria Chimica Ed Elettro Chimica. Process for the continuous production of phtalodinitrilem14,883,893, Cl. 558-308.000.

Pontoglio, Enrico; Parodi, Sandro; and Caretti, Giancarlo, to Caffaro s.p.a. Societa per l'Industria Chimica ed Elettrochimica. Process for the production in continuous of phthalodinitrilem14,883,894, Cl. 558-311.000.

Poole, Robert D.: *See—*
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Poon, Stephen S. C.: *See—*
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Popp, Robert L.: *See—*
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Porcaro, Eileen L. Combined locket and photo holderml4,882,915, Cl. 63-19.000.

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Power Plus, Inc.: *See—*
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Prater, Cordell E.: *See—*
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Prazak, Charles J., III, to Zenith Electronics Corporation. Inner surface specular reflection suppression in flat CRT faceplateml4,884,006, Cl. 313-474.000.

Preis, Karl-Heinz; and Schnaibel, Eberhard, to Robert Bosch GmbH. Method for influencing the driving speed of a motor vehicle and apparatus thereformI4,884,203, Cl. 364-426.040.

Prentice Hall, Inc.: *See—*
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Preston, Barry W.: *See—*
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Preston, Clyde N. Combination tubing cutter and releasing overshotml4,883,118, Cl. 166-55.300.

Prevorsek, D. C.: *See—*
Harpell, G. A.; Li, H. L.; Kwon, Y. D.; and Prevorsek, D. C., 4,883,700, Cl. 428-113.000.

Prevorsek, Dusan C.: *See—*
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Price, Anthony G.: *See—*
Campbell, Roy; Price, Anthony G.; and Green, Andrew P., 4,883,149, Cl. 188-264.00E.

Primavera, Stephen W.; Burbank, John J., Jr.; and Neault, Garrett J., to Vacco Industries. Underwater filter systemml4,883,588, Cl. 210-117.000.

Prime Actuator Control Systems Limited: *See—*
Calvert, Michael A., 4,883,262, Cl. 267-175.000.

Prince Corporation: *See—*
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Princeton University, The Trustees of: *See—*
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Procter & Gamble Company, The: *See—*
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Yang, David K., 4,883,684, Cl. 426-607.000.

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Pundsack, Arnold L.: *See—*
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Puritan-Bennett Corporation: *See—*
Hausman, Kenneth A.; and Merrick, Edwin B., 4,883,353, Cl. 356-41.000.
Merrick, Edwin B., 4,883,055, Cl. 128-633.000.

Purnell, Gabriel L. Insect elimination kit and methods for its useml4,882,873, Cl. 43-132.100.

Purnell, Mark L.; Oden, Robert R.; McCune, William L.; and Berkeley, Michael E. Apparatus and method for use in performing a surgical operationml4,883,048, Cl. 128-92.0VD.

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Pyzik, Aleksander J.; Dubensky, William J.; Schwarz, Douglas B.; and Beaman, Donald R., to Dow Chemical Company, The. Self-reinforced silicon nitride ceramic of high fracture toughness and a method of preparing the sameml4,883,776, Cl. 501-10.000.

Queirel, Joel. Device for thermoforming parts from synthetic materialml4,883,419, Cl. 425-326.100.

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Radtke, Waldemar: *See—*
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Raga, Manuel M.: *See—*
Foguet, Rafael; Ortiz, Jose A.; Gubert, Santiago; Raga, Manuel M.; and Sacristan, Aurelio, 4,883,797, Cl. 514-255.000.

Rahn, John; and Hutchings, Thomas J., to Litton Systems, Inc. Ring laser gyroscope mirror orientation system and methodml4,884,283, Cl. 372-107.000.

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French, Kent H., 4,883,633, Cl. 264-550.000.
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Ranco Incorporated: *See—*
White, Lee A., 4,882,908, Cl. 62-155.000.

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Rao, Nandakumar S.: *See—*
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Rathbone, Thomas, to BOC Group, Inc., The. Air separationml4,883,517, Cl. 62-22.000.

Rather, Howard H., to Aspen Peripherals Corp. Detection of non-zero errors in the prefix and completion frames of high density magnetic tapes and apparatus thereformI4,884,274, Cl. 371-57.200.

Ratz nee Simonek, Ildiko; Benko, Pal; Berenyi nee Foldermann, Edit; and Magyar, Karoly, to Egis Gyogyszergyar. Carbazatesml4,883,907, Cl. 560-24.000.

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Raychem Corporation: *See—*
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Lee, Huai-Chuan; Toratani, Hisayoshi; and Meissner, Helmuth E., 4,883,523, Cl. 65-30.140.
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Raymond, Eugene B., to General Electric Company. Dual caliber ammunition handling systemml4,882,972, Cl. 89-34.000.
Raynor, Robert J., to Olin Corporation. Aryl N,N-bis cinnamamide compounds and their use as ultraviolet light stabilizersml4,883,653, Cl. 424-60.000.
Raytheon Company: *See—*
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Deal, Samuel B.; and Bartch, Donald W., 4,884,004, Cl. 313-402.000.
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Hernqvist, Karl G., 4,883,437, Cl. 445-5.000.
Hernqvist, Karl G., 4,883,438, Cl. 445-5.000.
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Reed, Philip. Stair building template and method of usemI4,882,846, Cl. 33-464.000.
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Reigel, James R.; Corsmeier, Robert J.; Bertke, James H.; and Lenahan, Dean T., to General Electric Company. Turbine cooling air transferring apparatusml4,882,902, Cl. 60-39.750.
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Research Development Corporation: *See—*
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Reynolds, John: *See—*
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Grosjean, Pierre, 4,883,706, Cl. 428-215.000.
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Gradeff, Peter S., 4,883,689, Cl. 427-297.000.
Rhone-Poulenc Specialites Chimiques: *See—*
Amiet, Louis; and Langlois, BErnard, 4,883,904, Cl. 560-174.000.
Ribnitz, Peter. Electrostatic powder coating installation and method of operating the sameml4,883,506, Cl. 55-96.000.
Ricard, Vernon F. Odor removing device for toiletsml4,882,790, Cl. 4-213.000.
Ricca, Tom L. Page turning devicemI4,882,969, Cl. 84-487.000.
Riccio, Louis M.; and Bosna, Alexander A. Method of adhering thermal spray to substrate and product formed therebyml4,883,703, Cl. 428-142.000.
Richeson, William E., Jr., to Magnavox Government and Industrial Electronics Company. Potential-magnetic energy driven valve mechanismml4,883,025, Cl. 123-90.110.
Rickerl, Paul G.: *See—*
Feilchenfeld, Natalie B.; Fuerniss, Stephen J.; Glenning, John J.; Pawlowski, Walter P.; Phelan, Giana M.; and Rickerl, Paul G., 4,883,744, Cl. 430-325.000.
Ricoh Company, Ltd.: *See—*
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Machida, Hajime, 4,883,710, Cl. 428-336.000.
Takahashi, Junichi; Kosaka, Daisuke; Eguchi, Hirotoshi; Matsumoto, Shoji; Akahori, Takashi; Yamazaki, Hiroshi; and Izumi, Kouji, 4,884,051, Cl. 338-4.000.
Ricoh Research Institute of General Electronics: *See—*
Ishida, Mamoru; Inaki, Shunichi; Akiyama, Yoshikazu; and Kohata, Mitsuhiro, 4,883,766, Cl. 437-40.000.
Rieke, Brent E., to Caterpillar Inc. Mounting arrangement for a bearing assemblyml4,883,373, Cl. 384-585.000.
Rieker, David A.: *See—*
Keys, John B.; and Rieker, David A., 4,884,234, Cl. 364-900.000.
Riendeau, Michael P.: *See—*
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Riethorst, Waander; Konig, Bondewyn W.; van Aken, Willem G.; Bantjes, Adriaan; Beugeling, Tom; and Te Booy, Marcelinus P. W. M., to Riethorst, Waander. Process for isolating coagulation factors, and adsorbent material suitable thereforml4,883,598, Cl. 210-656.000.
Riew, Changkiu K.; and Morris, Roger E., to B.F. Goodrich Company, The. Polycarbonate compositions having multiple phase impact modifiers thereinml4,883,841, Cl. 525-148.000.
Rink, Frederick J., Jr., to General Electric Company. Automatic oil draining system for generatorsml4,883,995, Cl. 310-55.000.
Rischen, Dietmar: *See—*
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Rispeter, Siegfried, to Dr. Ing. h.c.F. Porsche AG. Drive arrangement for connecting a vehicle output shaft to a vehicle axleml4,883,142, Cl. 180-245.000.
Rittal-Werk Rudolf Loh GmbH & Co. KG: *See—*
Immel, Manfred, 4,882,911, Cl. 62-288.000.
Ritterman, Paul H. Lotion applicatorml4,883,380, Cl. 401-208.000.
Rivera, James A.: *See—*
Sansevero, Frank M.; Seehausen, Klaus; Rivera, James A.; Nguyen, Dat; and Borchers, Peter, 4,883,160, Cl. 198-328.000.
Rivero, Jose L.: *See—*
Agnew, Palmer W.; Clayton, Neil H.; Judkovics, Monroe; Rivero, Jose L.; and Sun, Kuo-chang, 4,884,218, Cl. 364-513.000.
Rizza, Michael C. Method and apparatus for sealing expandable roof joints with optical insulationml4,882,890, Cl. 52-396.000.
Rizzoli, Salvatore: *See—*
Mattei, Riccardo; and Rizzoli, Salvatore, 4,883,075, Cl. 131-84.400.
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Robak, Frank E., Sr.; and Robak, Andrew H., Jr., to RobaTherm Products. Low voltage heating element for portable toolsml4,883,942, Cl. 219-227.000.
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Robak, Frank E., Sr.; and Robak, Andrew H., Jr., 4,883,942, Cl. 219-227.000.
Robert Bosch GmbH: *See—*
Abbing, Andreas; Bertling, Hannes; Kehl, George; Mergenthaler, Robert; Rischen, Dietmar; Schafer, Ernst-Dieter; Schmitt, Edgar; and Siegel, Heinz, 4,882,976, Cl. 91-376.00R.
Herbst, Kurt, 4,883,088, Cl. 137-510.000.

Preis, Karl-Heinz; and Schnaibel, Eberhard, 4,884,203, Cl. 364-426.040.
Roberts Corporation: *See*—
Bellis, Kenneth E.; Brown, Jackson E.; Nagarwalla, Pheroze J.; Niedermeyer, William; and Pawlak, Paul, 4,883,558, Cl. 156-292.000.
Roberts, Freddie R.; and Lancette, Robert W., to Pee Patch, Inc. Children's toilet training device with differentiating meansml4,883,749, Cl. 434-247.000.
Roberts, Gary E.; and Reid, James, to Applied Magnetics Corporation. Thin film magnetic head with coil windings receiving trenchml4,884,157, Cl. 360-125.000.
Roberts, James R. Indirect lighting fixtureml4,884,178, Cl. 362-241.000.
Robertshaw Controls Company: *See*—
Llewellyn, David T.; and Lichtenberger, William J., 4,883,983, Cl. 307-112.000.
Robertson, John A., to Telesis Controls Corporation. Dot matrix formed security fontsml4,883,291, Cl. 283-117.000.
Robertson, Stuart H.: *See*—
Davies, Geoffrey J.; Hedges, Lesley K.; and Robertson, Stuart H., 4,883,648, Cl. 423-290.000.
Robertson, William M.: *See*—
Marlow, Raymond; Robertson, William M.; and Burke, Edward J., 4,883,538, Cl. 106-287.130.
Robinson, John S.: *See*—
Haushalter, Frederick W.; and Robinson, John S., 4,883,144, Cl. 181-198.000.
Robinson, John W.: *See*—
Hefner, Robert E., Jr.; Robinson, John W.; and Earls, Jimmy D., 4,883,844, Cl. 525-472.000.
Robinson, Mark L.: *See*—
Matlock, David K.; Riendeau, Michael P.; and Robinson, Mark L., 4,883,545, Cl. 148-12.00B.
Robinson, Tibor; and W.[illegible], Rainer, to Sandoz Ltd. Flameproofing compoundsml4,883,615, Cl. 428-423.100.
Rock, Erich; Rupprechter, Helmut; and Brustle, Klaus, to Julius Blum Gesellschaft M.B.H. Furniture hinge including hinge arm releasably connected to mounting platesml4,882,808, Cl. 16-240.000.
Rockwell International Corporation: *See*—
Ijichi, Yuji, 4,882,990, Cl. 101-348.000.
Landt, Don L., 4,884,077, Cl. 342-202.000.
Rocky, William C. Fuel vaporizerml4,883,040, Cl. 123-557.000.
Rocroi Jean-Pierre: *See*—
Naville, Charles; Spitz, Simon; and Rocroi Jean-Pierre, 4,884,030, Cl. 324-344.000.
Rogan, John B.: *See*—
Leung, Linus; and Rogan, John B., 4,883,847, Cl. 526-84.000.
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Rogers, Barbara R.: *See*—
Rogers, Nathan J.; and Rogers, Barbara R., 4,882,803, Cl. 15-167.100.
Rogers, Nathan J.; and Rogers, Barbara R. Dental apparatusml4,882,803, Cl. 15-167.100.
Roggenstein, Walter; and Rustemeyer, Paul, to Rhodia AG. Method for separating coarse grained and agglomerate pigment particles from a suspensionml4,883,603, Cl. 210-802.000.
Rohrle, Dieter; Graton, Michel; and Lhermitte, Philippe, to Valeo. Torsion damping device for a disc type friction clutch for an automobile vehicleml4,883,156, Cl. 192-106.200.
Roling, Paul V.; and Niu, Joseph H. Y., to Betz Laboratories, Inc. Methods for deactivating iron in hydrocarbon fluidsml4,883,580, Cl. 208-48.0AA.
Rolls-Royce Motor Cars Limited: *See*—
Laurie, Stephen A., 4,883,296, Cl. 292-336.300.
Rooney, James A.: *See*—
Heyser, Richard C.; and Rooney, James A., 4,884,246, Cl. 367-7.000.
Rose, Floyd D. Tremolo apparatus having broken string compensation featureml4,882,967, Cl. 84-313.000.
Rosen, Leon D.: *See*—
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Gutnick, David L.; Nestaas, Eirik; Rosenberg, Eugene; and Sar, Nechemia, 4,883,757, Cl. 435-252.100.
Rosenberger, Michael: *See*—
Aig, Edward R.; Coffey, John W.; Lovey, Allen J.; and Rosenberger, Michael, 4,883,613, Cl. 260-408.000.
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Ross Operating Valve Company: *See*—
Weiler, Charles A.; and Mathis, Logan H., 4,883,091, Cl. 137-625.640.
Roth, Alfred C. Picnic table covermI4,883,001, Cl. 108-90.000.
Rothlisberger, Rudi: *See*—
Hanefeld, Wolfgang; Rothlisberger, Rudi; and Noser, Friedrich, 4,883,652, Cl. 424-59.000.
Rothwell, Harold L., Jr.; and Grant, Jeffrey O., to GTE Products Corporation. Color selectable source for pulsed arc discharge lampsml4,884,009, Cl. 315-246.000.
Roussel Uclaf: *See*—
Martel, Jacques; Tessier, Jean; and Teche, Andre, 4,883,806, Cl. 514-417.000.
Roy, Carl W.: *See*—
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Royal Ordnance plc: *See*—
Baxter, James E.; and Poole, Robert D., 4,882,997, Cl. 102-503.000.
Rub, Winfried, to Mannesmann Rexroth GmbH. Multi-way control valve apparatusml4,883,092, Cl. 137-625.650.
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Ruest, Dennis A., to Monsanto Company. Process for the preparation of alkylthioalkanoate saltsml4,883,911, Cl. 562-581.000.
Ruhrchemie Aktiengesellschaft: *See*—
Hobes, John; Payer, Wolfgang; and Bexten, Ludger, 4,883,853, Cl. 526-329.000.
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Ruller, James A.: *See*—
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Kornaker, Walter; and Ruopp, Horst, 4,884,005, Cl. 313-404.000.
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Russell, Ronald R.: *See*—
Dziura, Richard A.; Russell, Ronald R.; and Scott, Graham A., 4,884,164, Cl. 361-97.000.
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Holderfield, Daron C.; Martin, Bernard E.; and Russell, Samuel S., 4,884,027, Cl. 324-158.00F.
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Chien, Yie W.; Lee, Chia-Shun; Valia, Kirti H.; and Chien, Te-Yen, 4,883,669, Cl. 424-448.000.
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Cole, Michael; Munden, Dennis L.; and Ryan, Marilynn J., 4,883,531, Cl. 73-9.000.
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S. C. Johnson & Son, Inc.: *See*—
Etter, Robert M.; and Neumiller, Phillip J., 4,883,540, Cl. 134-1.000.
S&G Implants GmbH: *See*—
Grundei, Hans; Hipp, Erwin; and Heinhuber, Bernd, 4,883,489, Cl. 623-22.000.
S.T.C., Inc.: *See*—
Kitchens, James L., 4,883,225, Cl. 236-34.500.
Sabel, Bernhard A.; Freese, Andrew; and Saltzman, William M., to Massachusetts Institute of Technology. Controlled drug delivery system for treatment of neural disordersml4,883,666, Cl. 424-422.000.
Sable, Daniel M., to General Electric Company. Dual-mode controlled pulse width modulatorml4,884,183, Cl. 363-41.000.
Sabo, Robert C. Sealing systemml4,883,279, Cl. 277-1.000.
Sachs, Howard G.; Cho, James Y.; and Hollingsworth, Walter H., to Intergraph Corporation. Method and apparatus for addressing a cache memoryml4,884,197, Cl. 364-200.000.
Sacks, Robert N.; and Tanski, William J., to United Technologies Corporation. Monolithic electro-acoustic device having an acoustic charge transport device integrated with a transistorml4,884,001, Cl. 310-313.00A.
Sacristan, Aurelio: *See*—
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Sadakane, Hirofumi: *See*—
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Saeger, James C.: *See*—
Johanson, Niles W.; Saeger, James C.; and White, Mark L., 4,883,115, Cl. 165-1.000.
Saelens, William R.; and Osborne, Gary L. Insulated bottle rack apparatus for bicyclesml4,883,205, Cl. 224-32.00R.
Saft S.A.: *See*—
Gerard, Claude, 4,883,725, Cl. 429-99.000.
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Sagawa, Takayoshi: *See*—
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Saghatchi, Hamid; and Taylor, Geoffrey L., to Welch Allyn, Inc. Slotted thrusters for fluid propelled borescopesml4,883,355, Cl. 356-241.000.
Sagi, Nehemia, to Automatic Tool Control and Management Systems, Inc. Automatic tool changer for workpiece processing machinesml4,883,939, Cl. 219-125.100.
Sagiv, Oded, to Xerox Corporation. Liquid ink development systemml4,883,018, Cl. 118-660.000.
Sahara, Hiroshi: *See*—
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Saipem S.p.A.: *See—*
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Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, 4,883,879, Cl. 546-280.000.

Saito, Ken-Ichi: *See—*
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Saito, Kenji: *See—*
Mochizuki, Hiroshi; Tamaki, Reiji; Arima, Junichi; Ikegami, Masaaki; Tanaka, Eisuke; and Saito, Kenji, 4,884,120, Cl. 357-68.000.

Saito, Shigeo: *See—*
Yokota, Minoru; Nagata, Masayuki; Saito, Shigeo; and Yamada, Yuichi, 4,883,922, Cl. 174-125.100.

Saito, Shinji: *See—*
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Saito, Yoshikazu: *See—*
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Saitoh, Yokuo: *See—*
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Saka, Tsutomu: *See—*
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Sakaguchi, Shinji; and Tan, Shiro, to Fuji Photo Film Co., Ltd. Light-sensitive resin composition with 1,2-naphthoquinone diazide compound having spirobichroman or spirobiindane ringml4,883,739, Cl. 430-192.000.

Sakai, Jiro: *See—*
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Sakai, Shinji: *See—*
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Sakai, Takamasa; and Muraoka, Yuusuke, to Dainippon Screen Mfg. Co., Ltd. Apparatus for heat treating substratesml4,883,424, Cl. 432-77.000.

Sakai, Yasuo; and Wada, Morihito, to NEC Home Electronics Ltd. Attaching device in a spring-charged dot printerml4,882,987, Cl. 101-13.040.

Sakai, Yoshio: *See—*
Ando, Takeki; Nakamura, Kiyoshi; Mine, Toshisuke; Inaba, Hiromi; Kurosawa, Toshiaki; Nakazato, Masao; and Sakai, Yoshio, 4,884,182, Cl. 363-37.000.

Sakai, Yuichi, to Top Kogyo Co., Ltd. Hand toolml4,882,959, Cl. 81-416.000.

Sakakibara, Takashi: *See—*
Kobayashi, Toshimitsu; Inagaki, Akio; Kobayashi, Yasuhiro; Mori, Masanori; and Sakakibara, Takashi, 4,883,448, Cl. 474-260.000.

Sakamaki, Yosio; Ideshita, Yuji; Fujita, Fumiyoshi; and Sugiyama, Takashi, to Yoshida Industry Co., Ltd. Make-up tool and holder assemblyml4,883,079, Cl. 132-318.000.

Sakamoto, Tatsurou; Ito, Masayoshi; and Yamano, Yoshinori, to Sony Corporation. Apparatus for fixturing a cathode ray tubeml4,883,439, Cl. 445-66.000.

Sakane, Isamu: *See—*
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Sakano, Tetsuro, to Fanuc Ltd. Method for detecting positionml4,884,226, Cl. 364-560.000.

Sakanobe, Minoru: *See—*
Iwase, Takayuki; Sakanobe, Minoru; and Koga, Yuji, 4,883,376, Cl. 400-83.000.

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Sakatani, Fumio: *See—*
Yasuno, Hiroshi; Sakatani, Fumio; and Kanda, Takeshi, 4,883,575, Cl. 204-198.000.

Sakizadeh, Kumars: *See—*
Grieve, Duncan M. A.; Poon, Stephen S. C.; Thien, Tran V.; Sakizadeh, Kumars; and Weigel, David C., 4,883,747, Cl. 430-542.000.

Sakong, Chul H. Folding table and seat assemblyml4,883,314, Cl. 297-159.000.

Sakurai Machine Trading Co., Ltd.: *See—*
Yamaguchi, Yuji, 4,882,988, Cl. 101-232.000.

Salkind, Harry, to McCabe-White Investment Corporation. Compact, portable, rowing type exercise apparatus usable by a chair-seated exerciserml4,883,268, Cl. 272-73.000.

Saltzman, William M.: *See—*
Sabel, Bernhard A.; Freese, Andrew; and Saltzman, William M., 4,883,666, Cl. 424-422.000.

Salvadori, Bruno, to Pirelli Coordinamento Pneumatici S.p.A. Press for tires and automatic device for rapidly dismounting the relative vulcanizing moldml4,883,415, Cl. 425-47.000.

Samejima, Kazuo; Tsuchihashi, Hironori; Sato, Tsuyoshi; Hamada, Toshihiko; Kida, Hideo; and Kasamatsu, Kiyoto, to Kubota, Ltd. Connecting link structure for a lawn mowerml4,882,898, Cl. 56-208.000.

Samejima, Mutsumi: *See—*
Koga, Kunio; Shima, Koji; and Samejima, Mutsumi, 4,883,912, Cl. 562-608.000.

Sameshima, Kenji: *See—*
Ogawa, Hirofumi; Sameshima, Kenji; Hirai, Tadaaki; Unnai, Takaaki; Yamamoto, Masanao; Shidara, Keiichi; Yamazaki, Junichi; Hiruma, Eikiyu; and Suzuki, Shirou, 4,883,562, Cl. 156-643.000.

Sampson, Coy L.: *See—*
Weathers, John B.; Mitchell, Paul B., Jr.; Sampson, Coy L.; and Hubbs, Charles B., 4,882,818, Cl. 26-15.00R.

Samsung Electronics Co., Ltd: *See—*
Ahn, Hee K., 4,884,153, Cl. 360-85.000.

Sanada, Katsuiki: *See—*
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Sanai, Shigeru: *See—*
Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, 4,883,879, Cl. 546-280.000.

Sanchez, Hernando; Franczak, Richard M.; and Futter, Menachem, to Revlon, Inc. Sample strip and dispensing apparatus thereforml4,883,197, Cl. 221-26.000.

Sanden Corporation: *See—*
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Sander, Craig S.: *See—*
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Sanderson, Neil E.: *See—*
Kinge, Nigel; Sanderson, Neil E.; and Mills, David J., 4,883,957, Cl. 250-283.000.

Sandham, H. J.; and Balanyk, Thomas E., to University of Toronto Innovations Foundations. Benzoin antimicrobial dental varnishesml4,883,534, Cl. 106-35.000.

Sandman, Leonardo: *See—*
Mor, Yeshayahu; and Sandman, Leonardo, 4,884,231, Cl. 364-736.000.

Sandoz Ltd.: *See—*
Robinson, Tibor; and Wolf, Rainer, 4,883,615, Cl. 428-423.100.

Sangyoji, Kazuo: *See—*
Sonoda, Takakuni; Tanabe, Kazunori; Iwase, Morikazu; Sangyoji, Kazuo; and Kato, Tokunori, 4,884,082, Cl. 346-105.000.

Sankyo Company Limited: *See—*
Kaneko, Isao, 4,883,784, Cl. 514-8.000.

Sankyo Manufacturing Co., Ltd.: *See—*
Kato, Heizaburo, 4,883,210, Cl. 226-100.000.

Sano, Hiroyuki; Kizaki, Masatoshi; and Iwanaga, Yukiya, to Fuji Oil Company, Limited. Method for preparation of solid foodstuffsml4,883,683, Cl. 426-582.000.

Sanofi: *See—*
Roger, Pierre; Fournier, Jean-Paul; and Leroy, Rolande, 4,883,903, Cl. 560-137.000.

Sanozky-Dawes, Rosemary B.: *See—*
Klaenhammer, Todd R.; and Sanozky-Dawes, Rosemary B., 4,883,756, Cl. 435-252.300.

Sansevero, Frank M.; Seehausen, Klaus; Rivera, James A.; Nguyen, Dat; and Borchers, Peter, to Otis Elevator Company. Curved escalator with fixed center constant radius path of travelml4,883,160, Cl. 198-328.000.

Sanshin Industry Co., Ltd.: *See—*
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Sanyo Electic Co., Ltd.: *See—*
Miura, Norio, 4,884,125, Cl. 357-74.000.

Sanyo Electric Co., Ltd.: *See—*
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Terada, Hiroaki; Asada, Katsuhiko; Nishikawa, Hiroaki; Miyata, Souichi; Asano, Hajime; Shimizu, Masahisa; Shima, Kenji; and Komori, Shinji, 4,884,192, Cl. 364-200.000.

Sar, Nechemia: *See—*
Gutnick, David L.; Nestaas, Eirik; Rosenberg, Eugene; and Sar, Nechemia, 4,883,757, Cl. 435-252.100.

Sardou, Max A., to Thor S.A. Axle assembly for a motor vehiclem4,883,289, Cl. 280-684.000.

Sartor, Mariano; and Tonel, Valerio, to Nordica S.p.A. Closure and adjustment device, particularly for ski bootsml4,882,857, Cl. 36-120.000.

Sarugaku, Shinichi, to Hitachi Ltd.; and Hitachi Keiyo Engineering Co., Ltd. Method and apparatus for automatically performing work on an object along a desired pathml4,883,938, Cl. 219-124.340.

Sasaki, Kazutomo: *See—*
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Sato, Hideki; Mizunoya, Nobuyuki; Asai, Hironori; Anzai, Kazuo; and Hatano, Tsuyoshi, to Kabushiki Kaisha Toshiba. Circuit substrate comprising nitride type ceramics, method for preparing it, and metallizing composition for use in itml4,883,704, Cl. 428-209.000.

Sato, Hiroshi: *See—*
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Sato, Katsuhiko: *See*—
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Sato, Masatoshi; Ogawara, Kensuke; and Emura, Noriaki, to Tosoh Corporation; and Hodogaya Chemical Co., Ltd. Polyphenylene sulfide resin composition useful for platingml4,883,702, Cl. 428-141.000.

Sato, Nobuyuki: *See*—
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Sato, Tsuyoshi: *See*—
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Sato, Yuji; Kono, Hiromi; Tanoue, Akifumi; and Kimura, Yoshiyuki, to Diesel Kiki Co., Ltd. Automatic gear change devicesml4,884,201, Cl. 364-424.100.

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Satoh, Takateru, to TDK Corporation. Braking arrangement in a magnetic tape cassettesml4,884,159, Cl. 360-132.000.

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Sattin, William, to Picker International, Inc. Quick imaging scheme utilizing differently phase encoded primary and stimulated echoesml4,884,029, Cl. 324-309.000.

Sattler, Hans-Peter; and Nichtweiss, Bernd, to Metallgesellschaft AG. Process of separating special steel components from lump shredder scrapml4,883,584, Cl. 209-38.000.

Sauer, Joe D.: *See*—
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Saukkonen, Seppo; and Tomma, Kauko, to Valmet Paper Machinery, Inc. Method for controlling the reeling of a webml4,883,233, Cl. 242-66.000.

Savage, John V.: *See*—
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Savnik, Davorin. Angled head hammerml4,882,955, Cl. 81-20.000.

Sawada, Kozo: *See*—
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Sawyer, Philip N., to Interface Biomedical Laboratories Corp. Safety needle sheath in anti-reflux catheter having novel valve meansml4,883,461, Cl. 604-53.000.

Schabert, Hans-Peter, to Siemens Aktiengesellschaft. Rotating piston compressorml4,883,414, Cl. 418-57.000.

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Schaffner, Paul E., II; and Schaffner, Gus J., III, to Schaffner Manufacturing Company, Inc. Ganging of buffing wheelsml4,882,880, Cl. 51-358.000.

Schaft, Volker. Apparatus for curing coatings applied to a memberml4,882,853, Cl. 34-68.000.

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Schiffman, Julius. Apparatus for promoting the vigilance of a motor vehicle operatorml4,884,135, Cl. 358-103.000.

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Schmid, Jean-Phillipe. Locking mechanismml4,882,817, Cl. 24-707.600.

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Schulhoff, Saul, Jr. Power transmission beltml4,883,447, Cl. 474-242.000.

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Schultz, Gary R.; and Kwasniewski, Dale L., to Eaton Corporation. Rotary wheel-end assembly for tire inflation systemml4,883,106, Cl. 152-417.000.

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Seidenberg, Benjamin; and Swanson, Theodore D., to United States of America, National Aeronautics and Space Administration. Ceramic heat pipe wickml4,883,116, Cl. 165-104.260.
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Sekoulov, Ivan; and Braeutigam, Hans-Juergen. Flooded biological film reactor for water treatment, with gas charging via a membraneml4,883,594, Cl. 210-603.000.
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Sero, Samuel J.; Collins, James S.; and Yates, Victor, to S.A.F.E. Anchoring and foundation support apparatus having moment resisting vanes and methodml4,882,891, Cl. 52-742.000.
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Shinohara, Toshio: *See*—
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Shinozaki, Kazuo: *See*—
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Shinozaki, Takashi: *See*—
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Shiohara, Tomoo: *See*—
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Shirai, Koji, to Kabushiki Kaisha Toshiba. Double diffused mosfet with potential biasesml4,884,116, Cl. 357-41.000.
Shirasu, Isao: *See*—
Fujitani, Takashi; Uemura, Hiromi; Kishimoto, Toshiaki; Uchiyama, Masayuki; Shirasu, Isao; Kurokawa, Hideyuki; Nishioka, Takashi; Kikukawa, Kenji; and Sato, Yoshinori, 4,883,185, Cl. 212-147.000.
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Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita, Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, to Hitachi, Ltd. Magnetic recording mediumml4,883,711, Cl. 428-336.000.
Shishikui, Yoshiaki: *See*—
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Shitani, Kensai: *See*—
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Shizume, Takeharu: *See*—
Yano, Kenichi; Midorikawa, Hiroshi; Kamei, Toshiaki; and Shizume, Takeharu, 4,883,250, Cl. 248-638.000.
Shizuoka Prefectural Government: *See*—
Kato, Eiji; Kuboshima, Katsumi; and Kaneko, Tomoyuki, 4,883,196, Cl. 220-415.000.
Shizuoka Seiki Co., Ltd.: *See*—
Kuwabara, Yohei; and Asaoka, Teruo, 4,883,568, Cl. 204-129.430.
Shoji, Hisashi; Haneda, Satoshi; and Yoshino, Kunihisa, to Konica Corporation. Image recording with data transmission bypass and shift registerml4,884,149, Cl. 358-300.000.
Shoji, Takashi: *See*—
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Showa Denko Kabushiki Kaisha: *See*—
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Shug, Austin L.; and Keene, Bruce W. Method for preventing diet induced carnitine deficiency in domesticated dogs and catsml4,883,672, Cl. 426-2.000.
Sibalis, Dan, to Drug Delivery Systems Inc. Disposable and/or replenishable transdermal drug applicators and methods of manufacturing sameml4,883,457, Cl. 604-20.000.
SIDI SPORT S.a.s. di Dino Signori & C.: *See*—
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Sieburth, Scott M., to FMC Corporation. Substituted phenyltrialkylsilane insecticidesml4,883,789, Cl. 514-63.000.
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Ahne, Hellmut; and Plundrich, Winfried, 4,883,730, Cl. 430-18.000.
Apfelbacher, Walter; Wiessner, Edgar; and Barnklau, Karl-Hans, 4,883,927, Cl. 200-50.00C.
Caprasse, Friedhelm, 4,884,273, Cl. 371-49.400.
Franetzki, Manfred; Geisselbrecht, Georg; Buchholtz, Gerhard; Fickweller, Werner; and Obermann, Peter, 4,883,467, Cl. 604-152.000.
Kaufhold, Wolfgang, 4,884,181, Cl. 363-35.000.
Kess, Helmut, 4,883,984, Cl. 307-256.000.
Michel, Petra; and Geiger, Martin, 4,884,115, Cl. 357-42.000.
Neppl, Franz; and Winnerl, Josef, 4,884,117, Cl. 357-43.000.
Schabert, Hans-Peter, 4,883,414, Cl. 418-57.000.
Schmidt, Rolf; and Schierling, Hubert, 4,884,023, Cl. 324-158.0MG.
Spenke, Eberhard; and Stoisiek, Michael, 4,884,114, Cl. 357-38.000.
Sterk, Zvonimir, 4,883,036, Cl. 122-383.000.
Siemon Company, The: *See*—
Reed, Brian E., 4,883,432, Cl. 439-553.000.
Siemon, John A.; and Reed, Brian E., 4,883,430, Cl. 439-510.000.
Siemon, John A.; and Reed, Brian E., to Siemon Company, The. Bridge clip carrierml4,883,430, Cl. 439-510.000.
Sievers, Axel: *See*—
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Sigaud, Jean-Bernard: *See*—
Mauleon, Jean-Louis; and Sigaud, Jean-Bernard, 4,883,583, Cl. 208-113.000.
Signori, Dino, to SIDI SPORT S.a.s. di Dino Signori & C. Boots for motorcycle cross-country racingml4,882,858, Cl. 36-131.000.
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Silverman, Barry. Musical jewelry boxml4,882,966, Cl. 84-94.200.
Simeth, Claus, to M.A.N. Roland Druckmaschinen Aktiengesellschaft. Change-over inking unit of a sheet-fed rotary pressml4,882,991, Cl. 101-350.000.
Simms, Robert A., to Murasa International. Laser safety shutoff systemml4,884,275, Cl. 372-9.000.
Simon, Morris, to Beth Israel Hospital. Self-supporting angulator device for precise percutaneous insertion of a needle or other objectml4,883,053, Cl. 128-303.00B.
Simonette, Dallas W.: *See*—
Bruggeman, Jon; and Simonette, Dallas W., 4,882,978, Cl. 92-34.000.
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Sims, John W., Jr., to Magna-Seal, Inc. Magnetic casket seal assemblyml4,882,821, Cl. 27-17.000.
Sims, Merrick L. Hydrofoil keelml4,883,011, Cl. 114-39.100.
Singer, Norbert, to Dr. Ing. h.c.F. Porsche AG. Single seater motor vehicleml4,883,308, Cl. 296-185.000.
SinghDeo, Narendra N.; Mahulikar, Deepak; and Butt, Sheldon H., to Olin Corporation. Products formed of a ceramic-glass-metal compositeml4,883,778, Cl. 501-19.000.
Sipes, Donald L., Jr.: *See*—
Anthon, Douglas A.; and Sipes, Donald L., Jr., 4,884,277, Cl. 372-22.000.
Skeirik, Richard D.; and DeCaria, Frank O., to Du Pont de Nemours, E. I., and Company. Expert system with three classes of rulesml4,884,217, Cl. 364-513.000.
Skerrett, J. Richard: *See*—
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Skolaude, Werner; Eggendorfer, Gunnar; and Corduan, Horst, to Linde Akitengesellschaft. Process for air fractionation by low-temperature rectificationml4,883,518, Cl. 62-38.000.
Slack, William E., to Mobay Corporation. Liquid diphenylmetane diisocyanate compositionsml4,883,909, Cl. 560-351.000.
Slavsky, Robert J., Sr., to Shaw & Slavsky, Inc. Clip for mounting price cards upon container edgesml4,882,862, Cl. 40-324.000.

Sleve, Jerry F.: *See—*
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Whiteside, John F., 4,883,254, Cl. 251-335.200.
Slutz, David E.: *See—*
Deakins, Martin E.; Slutz, David E.; Johnson, Neil R.; Clark, Thomas J.; and Bovenkerk, Harold P., 4,883,500, Cl. 51-298.000.
Small, Kenneth T., to Boschert Incorporated. Power supply with reduced switching lossesml4,884,186, Cl. 363-132.000.
Smigerski, Hans-Juergen; and Ernst, Uwe, to Huls Aktiengesellschaft. Process for producing pourable powered rubber containing fillerml4,883,829, Cl. 523-334.000.
Smith, Daniel R. Power operated door guardml4,883,297, Cl. 292-339.000.
Smith, Kim R.; Sauer, Joe D.; and Borland, James E., to Ethyl Corporation. Quaternary ammonium compoundsml4,883,917, Cl. 564-292.000.
Smith, Leslie A. D.: *See—*
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Smith, Lonnie J.: *See—*
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Smith, Morris L.: *See—*
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Sms Schloemann-Siemag Aktiengesellschaft: *See—*
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Snamprogetti S.p.A.: *See—*
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Snead, Edwin DeS. Helicopter pad for trainsml4,883,241, Cl. 244-114.00R.
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Sociedad Anomina De Racionalcion Y Mecanizacion (Sadrym): *See—*
Diaz, Antonio G., 4,882,986, Cl. 99-494.000.
Societe Anonyme dite : Alsthom: *See—*
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Societe de Prospection et d'Inventions Techniques (S.P.I.T.): *See—*
Almeras, Roland, 4,883,213, Cl. 227-10.000.
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Froment, Francis, 4,883,152, Cl. 192-42.000.
Societe Francaise d'Equipements pour la Navigation Aerienne S.F.E.N.A.: *See—*
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Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "SNECMA": *See—*
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Sodeyama, Fumio: *See—*
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Soft Sheen Products, Inc.: *See—*
Williams, Barry W.; and Daniels, Pamela M., 4,883,657, Cl. 424-72.000.
Sogo, Akira, to Yamaha Corporation. FM demodulation circuitml4,884,037, Cl. 329-336.000.
Solar Lighting Research, Inc.: *See—*
Dominguez, Richard L., 4,883,340, Cl. 350-260.000.
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Bollinger, Karl, 4,882,859, Cl. 37-187.000.
Bollinger, Karl; and Barre, Daniel, 4,883,134, Cl. 175-96.000.
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Sonoda, Takakuni; Tanabe, Kazunori; Iwase, Morikazu; Sangyoji, Kazuo; and Kato, Tokunori, to Brother Kogyo Kabushiki Kaisha. Color image recording apparatusml4,884,082, Cl. 346-105.000.
Sony Corporation: *See—*
Nikura, Hideo, 4,883,994, Cl. 310-12.000.
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Sophianopoulos, Spyros; Darley, Kenneth S.; and Sair, Louis, to Griffith Laboratories, Limited, The. Method of forming liquid smokeml4,883,676, Cl. 426-314.000.
Soref, Richard A.: *See—*
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Souloumiac, Alain. Increased sensitivity optical keyboardml4,884,073, Cl. 341-31.000.
Southeast Foam Converting & Packaging, Inc.: *See—*
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Southmedic Incorporated: *See—*
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Southwest Research Institute: *See—*
Trujillo, David A.; McMahon, William A., Jr.; and Lyle, Robert E., Jr., 4,883,608, Cl. 252-189.000.
Sowerby, Brian D., to Commonwealth Scientific and Industrial Research Organization. Neutron and gamma-ray moisture assayml4,884,288, Cl. 378-51.000.
Sowinski, Eugene J.: *See—*
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Sowman, Harold G.: *See—*
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Klaric, Dinko, 4,883,395, Cl. 411-55.000.
Spash, John L., to Digital Equipment Corporation. Self-loading head assembly for disk drivesml4,884,155, Cl. 360-105.000.
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Spector, Donald. Aromatic foam-plastic decorative objectml4,883,692, Cl. 428-16.000.
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Spectran Corporation: *See—*
Vacha, Lubos J. B.; Monyihan, Cornelius T.; and Schultz, Peter C., 4,883,339, Cl. 350-96.340.
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Spencer, Gwynne W., II: *See—*
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Spencer, Herbert C.; and McKay, James G. Container for the transport of diagnostic specimensml4,882,893, Cl. 53-449.000.
Spencer, William A.: *See—*
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Spenke, Eberhard; and Stoisiek, Michael, to Siemens Aktiengesellschaft. Disconnectable thyristorml4,884,114, Cl. 357-38.000.
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Spinner, Georg. Transmitter/antenna baysml4,884,046, Cl. 333-260.000.
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Glaeser, Linda C.; Brazdil, James F., Jr.; and Toft, Mark A., 4,883,896, Cl. 558-319.000.
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Stangl, Kurt. Process of marking hot steel ingots and productml4,883,720, Cl. 428-552.000.
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Stanley Electric Co., Ltd.: *See—*
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Stedman, David; and Harui, Norio, to Advanced Technology Laboratories, Inc. Intravaginal transducer biopsy guideml4,883,059, Cl. 128-660.010.
Steer, Peter L., to E. R. Squibb and Sons, Inc. Ostomy appliancesml4,883,477, Cl. 604-339.000.
Stein, James A. Grease injector for bicycle crank bearingsml4,883,368, Cl. 384-458.000.
Stein, Jehuda, to Nestec S.A. Process for the preparation of a sterilized casein-based liquid compositionml4,883,682, Cl. 426-580.000.
Stein, Michael H.: *See—*
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Steinhilber, Helmut. Control system for sheet-feeding device for printing apparatusml4,883,378, Cl. 400-624.000.
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Sterk, Zvonimir, to Siemens Aktiengesellschaft. Steam generatorml4,883,036, Cl. 122-383.000.
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Stockinger, Friedrich; and Stauffer, Werner, to Ciba-Geigy Corporation. Curable composition of polyether sulfone or polyether ketone copolymer and unsaturated imideml4,883,845, Cl. 525-534.000.
Stockinger, Friedrich, to Ciba-Geigy Corporation. Ethylenically unsaturated polyether sulfone or polyether ketone copolymerml4,883,855, Cl. 528-171.000.
Stockl, Rebecca R.; Barton, Kenneth R.; and Caldwell, Melvin A., to Eastman Kodak Company. Ink compositions and preparationml4,883,714, Cl. 428-412.000.
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Strickler, Ernst; and Wild, Hansueli, to Mettler Instrumente AG. Coupling for transmitting a rotary motionml4,883,444, Cl. 464-160.000.
Strohmeier, Fred; and Witt, Klaus. Pumping apparatus for delivering liquid at high pressureml4,883,409, Cl. 417-43.000.
Strong, Bernard, to Jordan Enterprises. Filling device with sound indicator for filling injection syringeml4,883,101, Cl. 141-27.000.
Stucky, Michael E., to E Z Dek, Inc. Deck for mobile homesml4,883,306, Cl. 296-162.000.
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Jude, Daniel; and Stull, James T., 4,883,369, Cl. 384-476.000.
Sturrock, James C.: *See—*
Stembridge, William F.; Sturrock, James C.; and Stembridge, W. Frank, 4,883,100, Cl. 141-1.000.
Stutsman, Richard, to Vertx Corporation. Apparatus and method for using unique charge cards dispensed from a vending machineml4,884,212, Cl. 364-479.000.
Such, Christopher H.: *See—*
Abboud, George E.; Such, Christopher H.; Horley, Susan M.; and Waters, Julian A., 4,883,873, Cl. 544-316.000.
Suemune, Toshiro: *See—*
Ito, Toshikazu; Suemune, Toshiro; and Sato, Katsuhiko, 4,884,162, Cl. 361-23.000.
Suga, Yoshinori; Tanaka, Eiji; Maruyama, Yasuo; and Isobe, Eiji, to Mitsubishi Chemical Industries Limited. Method for producing an olefin polymerml4,883,848, Cl. 526-124.000.
Sugawara, Koko: *See—*
Kamei, Hideo; Ohbayashi, Masaru; Tomita, Koji; Sugawara, Koko; and Konishi, Masataka, 4,883,758, Cl. 435-253.500.
Sugimoto, Koichi; Hirabayashi, Hisaaki; and Masui, Tomoyuki, to Hitachi, Ltd. Probing control method and apparatus for mechanism with multiple degrees of freedomml4,884,015, Cl. 318-640.000.
Sugimoto, Naohiko; and Fujita, Akira, to Fuji Photo Film Co., Ltd. Electrophoresis device with shark-toothed comb having a thickness determined by the thickness of the gelml4,883,577, Cl. 204-299.00R.
Sugimoto, Shigeru: *See—*
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,884,087, Cl. 354-75.000.
Sugimura, Hiroshi; Imada, Eiji; Kojima, Yoshimi; and Tsuchimoto, Shuhei, to Sharp Kabushiki Kaisha. Electrophotographic printing process using photochromic compoundml4,883,733, Cl. 430-54.000.
Sugitani, Tatsuo; Uchida, Kiyoyuki; and Inoue, Hideo, to Toyota Jidosha Kabushiki Kaisha. Vehicle braking system for drive wheels, having means for delaying commencement of brake pressure changeml4,883,326, Cl. 303-110.000.
Sugiyama, Masami; Kita, Nobuyuki; and Tasaka, Yoshihiro, to Minolta Camera Kabushiki Kaisha. Color measuring apparatusml4,884,221, Cl. 364-526.000.
Sugiyama, Takashi: *See—*
Sakamaki, Yosio; Ideshita, Yuji; Fujita, Fumiyoshi; and Sugiyama, Takashi, 4,883,079, Cl. 132-318.000.
Sullivan, Daniel A., Jr.: *See—*
Duncan, Edward H., 4,883,398, Cl. 411-344.000.
Sullivan, Thomas F.: *See—*
Perry, John H., Jr.; Bhatt, Bharat K.; Capps, Jesse; Eldridge, Paul M.; Greiner, Leonard; Lockyer, Robert W.; Martin, Michelle; McNeice, Raymond R.; Misiaszek, Steven M.; Perry, Stanton S.; Sullivan, Thomas F.; and Campbell, Paul G., 4,883,823, Cl. 518-702.000.
Sulzer Brothers Limited: *See—*
Frey, Otto; and Koch, Rudolf, 4,883,492, Cl. 623-23.000.
Pfarrwaller, Erwin, 4,883,098, Cl. 139-439.000.
Sum, Phaik E.: *See—*
Wissner, Allan; Sum, Phaik E.; and Schaub, Robert E., 4,883,816, Cl. 514-546.000.
Sumitomo Chemical Company, Limited: *See—*
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.
Tanaka, Shigeo; Sakai, Jiro; Fukao, Tomohisa; Wakatsuki, Kizuku; and Wakamatsu, Kazuki, 4,883,842, Cl. 525-240.000.
Sumitomo Electric Industries, Ltd.: *See—*
Yokota, Minoru; Nagata, Masayuki; Saito, Shigeo; and Yamada, Yuichi, 4,883,922, Cl. 174-125.100.
Sumitomo Heavy Industries Ltd.: *See—*
Wolf, Manfred, 4,883,114, Cl. 164-478.000.
Sumitomo Metal Industries, Ltd.: *See—*
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.
Summa Vest, Inc.: *See—*
Westenskow, Dwayne R.; and Silva, Fidel, 4,883,051, Cl. 128-204.210.
Sun, Kuo-chang: *See—*
Agnew, Palmer W.; Clayton, Neil H.; Judkovics, Monroe; Rivero, Jose L.; and Sun, Kuo-chang, 4,884,218, Cl. 364-513.000.
Sun, Mei H.; Wickersheim, Kenneth A.; and Heinemann, Stanley O., to Luxtron Corporation. Fiberoptic sensing of temperature and/or other physical parametersml4,883,354, Cl. 356-128.000.
Sun Microsystems, Inc.: *See—*
Garner, Robert B.; and Agrawal, Anant, 4,884,198, Cl. 364-200.000.
Pflaumer, Michael W., 4,884,266, Cl. 370-84.000.
Sun, Shin-Ching. Ashtray apparatusml4,883,224, Cl. 232-43.100.
Sundawn Inc.: *See—*
Gross, Edward J., 4,883,139, Cl. 180-68.600.
Gross, Edward J., 4,883,303, Cl. 296-91.000.
Sundermeyer, Peter: *See—*
Lachmann, Karl-Heinz; Sundermeyer, Peter; Schreier, Johann; Reindler, Albrecht; and Leininger, Jurgen, 4,883,239, Cl. 244-3.150.
Sundstrand Corporation: *See—*
Dobbs, Bradley A.; Wigmore, David B.; and Niggemann, Richard E., 4,883,117, Cl. 165-164.000.
Welch, Richard C., 4,883,148, Cl. 184-6.400.
Sunshine, Abraham; and Laska, Eugene M., to Analgesic Associates. Onset-hastened/enhanced analgesiaml4,883,818, Cl. 514-570.000.

Sunyich, Steven L. Credit card storage systemml4,883,948, Cl. 235-382.000.
Surgical Systems & Instruments, Inc.: *See*—
Shiber, Samuel, 4,883,458, Cl. 604-22.000.
Susaki, Wataru: *See*—
Kumabe, Hisao; and Susaki, Wataru, 4,883,771, Cl. 437-129.000.
Sussangkarn, Kawporn: *See*—
Fodor, Gabor B.; Sussangkarn, Kawporn; and Veltri, Robert W., 4,883,808, Cl. 514-468.000.
Suzuki, Akiyoshi: *See*—
Ina, Hideki; and Suzuki, Akiyoshi, 4,883,359, Cl. 356-401.000.
Suzuki, Hiroshi, to NEC Corporation. Packet-switched communications network with parallel virtual circuits for re-routing message packetsml4,884,263, Cl. 370-16.000.
Suzuki, Hiroyuki: *See*—
Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita, Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, 4,883,711, Cl. 428-336.000.
Suzuki Jidosha Kogyo Kasbushiki Kaisha: *See*—
Umehara, Kazuhiro, 4,883,928, Cl. 200-81.90M.
Suzuki, Nobuo, to Kabushiki Kaisha Toshiba. Electronic camera having solid state image sensor with improved noise signal draiingml4,884,142, Cl. 358-213.190.
Suzuki, Ryo: *See*—
Maruyama, Youzi; Ikeda, Tadashi; and Suzuki, Ryo, 4,884,236, Cl. 365-29.000.
Suzuki, Shirou: *See*—
Ogawa, Hirofumi; Sameshima, Kenji; Hirai, Tadaaki; Unnai, Takaaki; Yamamoto, Masanao; Shidara, Keiichi; Yamazaki, Junichi; Hiruma, Eikiyu; and Suzuki, Shirou, 4,883,562, Cl. 156-643.000.
Suzuki, Syoichi: *See*—
Miyamoto, Yukihiko; Kobayashi, Hirokazu; and Suzuki, Syoichi, 4,884,267, Cl. 370-100.100.
Suzuki, Takao; and Uekido, Kouzou, to Japan Aviation Electronics Industry, Limited; and NEC Corporation. Electronic device packaging structureml4,883,429, Cl. 439-74.000.
Suzuki, Takeshi: *See*—
Nakamoto, Kouji; Suzuki, Takeshi; Abe, Shinya; Hayashi, Kenji; Kajiwara, Akiharu; Yamatsu, Isao; Otsuka, Issei; and Shiojiri, Hiroyuki, 4,883,916, Cl. 564-186.000.
Suzuki, Tetsuo: *See*—
Ozawa, Masakazu; Ozawa, Kunitaka; Hatanaka, Katsunori; Suzuki, Tetsuo; Mori, Tetsuzo; Shiina, Tadashi; and Ebinuna, Ryuichi, 4,884,085, Cl. 346-136.000.
Suzuki, Yasoji: *See*—
Egawa, Hideharu; and Suzuki, Yasoji, 4,883,986, Cl. 307-298.000.
Suzuki, Yasuo: *See*—
Ogawa, Hiroyasu; Kogo, Yasuo; Takahashi, Shuji; and Suzuki, Yasuo, 4,883,712, Cl. 428-367.000.
Suzuki, Yoshimi: *See*—
Ishikawa, Osamu; Sone, Mikihiko; and Suzuki, Yoshimi, 4,884,148, Cl. 358-464.000.
Swan, Daniel L.: *See*—
Uken, David; Truesdale, R. Grant, Jr.; and Swan, Daniel L., 4,883,431, Cl. 439-521.000.
Swanson, Theodore D.: *See*—
Seidenberg, Benjamin; and Swanson, Theodore D., 4,883,116, Cl. 165-104.260.
Swanton, Paul C.: *See*—
Martin, Robert G.; and Swanton, Paul C., 4,883,941, Cl. 219-216.000.
Swarovski, Helmut, to D. Swarovski & Co. Wrist watchml4,884,257, Cl. 368-276.000.
Sweenie, Richard E.: *See*—
Nagy, Gabor S.; Akeson, Richard C.; Sweenie, Richard E.; Novak, Mark E.; Malsch, Harry K.; Widule, Thomas J.; Ding, Gustav L. P.; and Jackson, Jared K., 4,882,930, Cl. 73-56.000.
Swindal, James L.; and Grantham, Daniel H., to United Technologies Corporation. Mesa fabrication in semiconductor structuresml4,883,768, Cl. 437-61.000.
Syntex (U.S.A) Inc.: *See*—
Houts, Thomas M.; and Ullman, Edwin F., 4,883,688, Cl. 427-285.000.
Szdzepanek, Andre; and Buchanan, George, to Texas Instruments Inc. Elastic buffer for local area networksml4,884,286, Cl. 375-118.000.
Szenger, Franz: *See*—
Breyer, Karl-Hermann; Herzog, Klaus; and Szenger, Franz, 4,882,848, Cl. 33-559.000.
Szeto, Roger: *See*—
Hui, Alex C.; Wong, Anthony Y.; Dell'Oca, Conrad J.; Wong, Daniel; and Szeto, Roger, 4,884,118, Cl. 357-45.000.
Szirt nee Kiszelly, Eniko : *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Szirt nee Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Jakfalvi, Elemer; Zukovics nee Sumeg, Katalin; Gado, Klara; and Hegedus, Maria, 4,883,798, Cl. 514-256.000.
Szlaga, Emil; Harris, Robert S.; and Thompson, Robert H., to Stant Inc. Filler neck sealing assemblyml4,883,103, Cl. 141-368.000.
T.T.C. Termo Tecnica Ceramica S.P.A.: *See*—
Cristea, Eugen D., 4,883,422, Cl. 431-182.000.
Tachi, Ryosuke: *See*—
Hosoe, Katsuharu; Itoh, Teruyoshi; Tachi, Ryosuke; and Nojiri, Takao, 4,883,033, Cl. 123-335.000.
Tachikawa Spring Co., Ltd.: *See*—
Adachi, Mitsuhiro, 4,883,318, Cl. 297-234.000.
Tadokoro, Yoshio: *See*—
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.
Tadros, Maher E., to Martin Marietta Corporation. Nonchromate deoxidizer for aluminum alloysml4,883,541, Cl. 134-3.000.
Taga, Yutaka: *See*—
Kashihara, Yuji; Taga, Yutaka; and Kubo, Seitoku, 4,882,952, Cl. 74-867.000.
Taira, Toshio: *See*—
Yoshizato, Katsutoshi; Taira, Toshio; and Miyata, Teruo, 4,883,487, Cl. 623-15.000.
Taisho Pharmaceutical Co., Ltd.: *See*—
Nakatsuka, Shin-ichi; Hayashi, Masatoshi; Yokomori, Sadakazu; Nakashima, Yoshimoto; Hatayama, Katsuo; and Araki, Hiroaki, 4,883,876, Cl. 546-51.000.
Takabatake, Mitsuo: *See*—
Kawakami, Keiichi; Takabatake, Mitsuo; and Chiba, Jiro, 4,883,705, Cl. 428-209.000.
Takagi, Kazumasa: *See*—
Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita, Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, 4,883,711, Cl. 428-336.000.
Takahashi, Junichi; Kosaka, Daisuke; Eguchi, Hirotoshi; Matsumoto, Shoji; Akahori, Takashi; Yamazaki, Hiroshi; and Izumi, Kouji, to Ricoh Company, Ltd. Semiconductor diffusion type force sensing apparatusml4,884,051, Cl. 338-4.000.
Takahashi, Junichi: *See*—
Matsui, Takayuki; Okuyama, Toshiaki; Matsutake, Mitsugu; Takahashi, Junichi; and Ito, Masami, 4,884,184, Cl. 363-46.000.
Takahashi, Katsuji: *See*—
Kariya, Kenichi; Noda, Masayuki; Yamaguchi, Takahiro; and Takahashi, Katsuji, 4,883,708, Cl. 428-263.000.
Takahashi, Ken; and Kabe, Kazuyuki, to Yokohama Rubber Co., Ltd., The. Heavy-duty pneumatic radial tireml4,883,108, Cl. 152-531.000.
Takahashi, Kenji: *See*—
Arakawa, Satoshi; Hosoi, Yuichi; Takahashi, Kenji; Tamura, Kaoru; and Satome, Shigeru, 4,883,961, Cl. 250-327.200.
Ozawa, Naoki; Akiyama, Toshiyuki; Takahashi, Kenji; Mimura, Itaru; and Nakano, Takahiro, 4,884,129, Cl. 358-44.000.
Takahashi, Shuji: *See*—
Ogawa, Hiroyasu; Kogo, Yasuo; Takahashi, Shuji; and Suzuki, Yasuo, 4,883,712, Cl. 428-367.000.
Takahashi, Yasuo, to Kato Hatsujo Kaisha, Ltd. Hose clamp furnished with tacking functionml4,882,814, Cl. 24-20.00R.
Takahashi, Yoshio: *See*—
Shimanuki, Haruki; Maki, Takao; and Takahashi, Yoshio, 4,883,325, Cl. 303-96.000.
Takahashi, Younosuke; and Kuriyama, Takayuki, to Fuji Photo Film Co., Ltd. Information recording mediumml4,883,741, Cl. 430-270.000.
Takaki, Shigeo: *See*—
Azukizawa, Teruo; Morishita, Mimpei; Yokoyama, Toyohiko; Takaki, Shigeo; Yuyama, Yoshio; and Noda, Akitaka, 4,882,999, Cl. 104-281.000.
Takakura, Jinnosuke: *See*—
Oshima, Hiroshi; Sadakane, Hirofumi; Katayama, Takao; Takakura, Jinnosuke; and Fujioka, Hisatake, 4,882,897, Cl. 56-11.300.
Takamizawa, Minoru: *See*—
Endo, Mikio; Takamizawa, Minoru; Ishihara, Toshinobu; Kubota, Tohru; and Shinohara, Toshio, 4,883,569, Cl. 204-157.740.
Takano, Takeshi: *See*—
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; Tsuge, Akihiko; Imagawa, Hiroshi; Takano, Takeshi; Ueno, Fumio; Horiguchi, Akihiro; and Inoue, Hiroshi, 4,883,780, Cl. 501-96.000.
Takano, Teruhisa; Yamasaki, Takahiko; and Akiyoshi, Mitsuo, to Matsushita Electric Industrial Co., Ltd. Heating apparatus having an open-loop configuration for controlling temperatureml4,883,944, Cl. 219-492.000.
Takase, Jinki: *See*—
Arino, Masao; and Takase, Jinki, 4,882,980, Cl. 92-48.000.
Takashima, Atsushi: *See*—
Kurita, Tetsuya; Takashima, Atsushi; and Shibasaki, Katsutami, 4,883,592, Cl. 210-227.000.
Takata, Keiji: *See*—
Hosoki, Shigeyuki; Hosaka, Sumio; and Takata, Keiji, 4,883,959, Cl. 250-306.000.
Takeda Chemical Industries, Ltd.: *See*—
Miyazima, Koichiro; Tomita, Keiko; and Nakagaki, Masayuki, 4,883,665, Cl. 424-417.000.
Takeda, Hiroshi, to Seiko Epson Corporation. Character pattern generator for dot matrix printerml4,883,377, Cl. 400-121.000.
Takeda, Shinji: *See*—
Hashimoto, Mitsuharu; and Takeda, Shinji, 4,883,253, Cl. 251-315.000.
Takei, Hisashi: *See*—
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,884,087, Cl. 354-75.000.

Takei, Katsumori: *See*—
Fukushima, Hitoshi; Takei, Katsumori; Iwamoto, Kohei; and Nakamura, Hiroto, 4,884,081, Cl. 346-74.600.
Takei, Kiyoshi: *See*—
Maruyama, Seisu; and Takei, Kiyoshi, 4,883,095, Cl. 139-91.000.
Takemoto, Masayuki; Nagura, Osamu; Nomura, Yukio; and Yasuda, Minoru, to Nippon Oil and Fats Co., Ltd. Thermosetting resin from amine terminated amic acid and bis-maleimideml4,883,858, Cl. 528-322.000.
Taketani, Noriaki: *See*—
Abe, Tomiya; Shimazaki, Yukio; Ishibashi, Takanobu; Abe, Norimoto; Asai, Takayasu; and Taketani, Noriaki, 4,883,338, Cl. 350-96.340.
Takeuchi, Yoshinori: *See*—
Onodera, Shuji; Sato, Taichi; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Yamada, Yoko; Yamaguchi, Yuzo; Takeuchi, Yoshinori; Hara, Shigeo; and Setone, Shouichi, 4,884,154, Cl. 360-104.000.
Takuma, Keisuke; Kuroda, Sizuo; Oyama, Tsukasa; and Aiga, Hiroshi, to Mitsui Toatsu Chemicals, Incorporated. Dichroic coloring agents for liquid crystal displayseml4,883,611, Cl. 552-235.000.
Talkie Tooter (Canada) Ltd.: *See*—
Nordholm, Ken; and Eyers, Bud, 4,884,067, Cl. 340-686.000.
Tam, Man C.; and Pundsack, Arnold L., to Xerox Corporation. Imaging systemml4,883,731, Cl. 430-41.000.
Tamai, Shoji: *See*—
Ohta, Masahiro; Kawashima, Saburo; Snobe, Yoshiho; Tamai, Shoji; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,883,718, Cl. 428-458.000.
Tamaki, Reiji: *See*—
Mochizuki, Hiroshi; Tamaki, Reiji; Arima, Junichi; Ikegami, Masaaki; Tanaka, Eisuke; and Saito, Kenji, 4,884,120, Cl. 357-68.000.
Tamamori, Hideo, to Nippon Air Brake Co., Ltd. Railway car pressure control valvesml4,883,089, Cl. 137-596.180.
Tamir, Ilana; Kidron, Ben-Zion; Wang, Lynn; and Inbar, Michael, to I.D.L. Int'l Diagnostic Laboratories Ltd. Method for the quantitative determination of lipoprotein components in a body fluid and method for separating lipoproteins from bloodml4,883,765, Cl. 436-71.000.
Tamura, Junichi; Hara, Ryoichi; Abe, Fumihiko; and Koaizawa, Hisashi, to Furukawa Electric Company, Ltd., The. Method of analyzing composition of optical fiber base material to be measured by radioactive raysml4,884,290, Cl. 378-83.000.
Tamura, Kaoru: *See*—
Arakawa, Satoshi; Hosoi, Yuichi; Takahashi, Kenji; Tamura, Kaoru; and Satome, Shigeru, 4,883,961, Cl. 250-327.200.
Tamura, Shuji: *See*—
Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Oginо, Keizo, 4,883,596, Cl. 210-638.000.
Tan, Shiro: *See*—
Sakaguchi, Shinji; and Tan, Shiro, 4,883,739, Cl. 430-192.000.
Tanabe, Kazunori: *See*—
Sonoda, Takskuni; Tanabe, Kazunori; Iwase, Morikazu; Sangyoji, Kazuo; and Kato, Tokunori, 4,884,082, Cl. 346-105.000.
Tanabe, Takeshi; and Hori, Toshio, to Murata Manufacturing Co., Ltd. Chip type component installation structureml4,883,920, Cl. 174-68.500.
Tanahashi, Toshio; Kanamaru, Masanobu; Itoh, Toshio; and Itoh, Kazuhiro, to Toyota Jidosha Kabushiki Kaisha. Combustion chamber of a two-stroke engineml4,883,030, Cl. 123-193.0CH.
Tanai, Tsuneo: *See*—
Oikawa, Toshihiro; Tanai, Tsuneo; Yamada, Noriyuki; Saka, Tsutomu; and Kobayashi, Toshiki, 4,883,027, Cl. 123-90.160.
Tanaka, Eiji: *See*—
Suga, Yoshinori; Tanaka, Eiji; Maruyama, Yasuo; and Isobe, Eiji, 4,883,848, Cl. 526-124.000.
Tanaka, Eisuke: *See*—
Mochizuki, Hiroshi; Tamaki, Reiji; Arima, Junichi; Ikegami, Masaaki; Tanaka, Eisuke; and Saito, Kenji, 4,884,120, Cl. 357-68.000.
Tanaka, Hiroshi: *See*—
Anzai, Satoru; and Tanaka, Hiroshi, 4,883,345, Cl. 350-418.000.
Tanaka, Hitoshi: *See*—
Kasai, Kazumi; Itoh, Hiromi; Tanaka, Hitoshi; Oh-hori, Tatsuya; and Komeno, Junji, 4,883,020, Cl. 118-719.000.
Tanaka, Kihachiro: *See*—
Onodera, Shuji; Sato, Taichi; Tanaka, Kihachiro; Saitoh, Yokuo; Daito, Hiroshi; Yamada, Yoko; Yamaguchi, Yuzo; Takeuchi, Yoshinori; Hara, Shigeo; and Setone, Shouichi, 4,884,154, Cl. 360-104.000.
Tanaka, Kunio: *See*—
Kishi, Hajimu; Tanaka, Kunio; Yukutomo, Masashi; and Matsumura, Teruyuki, 4,884,211, Cl. 364-474.220.
Tanaka, Makoto: *See*—
Yatomi, Takeshi; and Tanaka, Makoto, 4,883,933, Cl. 219-69.120.
Tanaka, Satoshi: *See*—
Nishimura, Hiroshi; and Tanaka, Satoshi, 4,883,529, Cl. 65-281.000.
Tanaka, Shigeo; Sakai, Jiro; Fukao, Tomohisa; Wakatsuki, Kizuku; and Wakamatsu, Kazuki, to Sumitomo Chemical Company, Limited. Resin compositionml4,883,842, Cl. 525-240.000.
Tanaka, Sumio; Atsumi, Shigeru; and Saito, Shinji, to Kabushiki Kaisha Toshiba. Nonvolatile semiconductor memory devicesml4,884,241, Cl. 365-210.000.
Tanaka, Syuji: *See*—
Shimizu, Takaaki; and Tanaka, Syuji, 4,883,521, Cl. 65-17.000.
Tanaka, Yoshihiro; Ootsuka, Hiroshi; and Hayama, Koh, to Minolta Camera Kabushiki Kaisha. Piezoelectric actuating deviceml4,884,090, Cl. 354-234.100.
Tandon Corporation: *See*—
Dalziel, Warren L., 4,884,261, Cl. 360-105.000.
Tani, Shichisei: *See*—
Hirose, Ichiro; Sagawa, Takayoshi; Tani, Shichisei; and Kato, Katsuo, 4,883,078, Cl. 131-280.000.
Taniguchi, George. Mailbox signal flag systemml4,883,223, Cl. 232-35.000.
Taniguchi, Hiroshi: *See*—
Ohtsu, Masamitsu; and Taniguchi, Hiroshi, 4,884,151, Cl. 358-330.000.
Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Pseudo format cameraml4,884,089, Cl. 354-222.000.
Taniguchi, Nobuyuki: *See*—
Inoue, Manabu; Taniguchi, Nobuyuki; Hata, Yoshiaki; Hoda, Takeo; Kudo, Yoshinobu; and Ueda, Hiroshi, 4,884,092, Cl. 354-289.100.
Kitaura, Mashio; Nakai, Masaaki; Yoshida, Tadahiro; Kikukawa, Yoshiiku; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,884,094, Cl. 354-412.000.
Taniguchi, Osamu: *See*—
Okada, Shinjiro; Yoshinaga, Kazuo; Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Hanyu, Yukio; Yamashita, Masataka; and Katagiri, Kazuharu, 4,883,344, Cl. 350-339.00R.
Tanimoto, Akikazu, to Nikon Corporation. Apparatus capable of adjusting the light amountml4,884,101, Cl. 355-68.000.
Tanimoto, Hiroshi: *See*—
Koyama, Mikio; and Tanimoto, Hiroshi, 4,884,036, Cl. 328-167.000.
Taniuchi, Akira; Komori, Hirohito; and Niwa, Koichi, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Imide bond-containing resins and flame retardants comprising said resinsml4,883,843, Cl. 525-327.600.
Tanoue, Akifumi: *See*—
Sato, Yuji; Kono, Hiromi; Tanoue, Akifumi; and Kimura, Yoshiyuki, 4,884,201, Cl. 364-424.100.
Tanski, William J.: *See*—
Sacks, Robert N.; and Tanski, William J., 4,884,001, Cl. 310-313.00A.
Tasaka, Yoshihiro: *See*—
Sugiyama, Masami; Kita, Nobuyuki; and Tasaka, Yoshihiro, 4,884,221, Cl. 364-526.000.
Tashiro, Akira: *See*—
Eda, Yasuyuki; Maeda, Toshihiro; Nishiyama, Kiyoto; and Tashiro, Akira, 4,883,752, Cl. 435-68.000.
Tashiro, Yasunori, to Rheon Automatic Machinery Co., Ltd. Method for shaping a spherical bodyml4,883,678, Cl. 426-496.000.
Tateishi, Mamoru: *See*—
Eitoku, Kenji; Tateishi, Mamoru; and Hayashi, Kenji, 4,884,052, Cl. 338-202.000.
Tauman, Harvey S.: *See*—
Goodman, Jack J.; Tauman, Harvey S.; Fox, Charles; and Hart, Thomas J., 4,883,659, Cl. 424-78.000.
Taylor, Edward C.; and Yoon, Cheol-min, to Princeton University, The Trustees of. N-(4-(1-hydroxy-3-(5,6,7,8-tetrahydropyrido(2,3,-d)-pyrimidin-6-yl)prop-2-yl)benzoyl)glutamic acid derivativesml4,883,799, Cl. 514-258.000.
Taylor, Geoffrey L.: *See*—
Saghatchi, Hamid; and Taylor, Geoffrey L., 4,883,355, Cl. 356-241.000.
Taylor, Peter: *See*—
Goddard, John; and Taylor, Peter, 4,883,410, Cl. 417-69.000.
TDK Corporation: *See*—
Satoh, Takateru, 4,884,159, Cl. 360-132.000.
Te Booy, Marcelinus P. W. M.: *See*—
Riethorst, Waander; Konig, Bondewyn W.; van Aken, Willem G.; Bantjes, Adriaan; Beugeling, Tom; and Te Booy, Marcelinus P. W. M., 4,883,598, Cl. 210-656.000.
Teche, Andre: *See*—
Martel, Jacques; Tessier, Jean; and Teche, Andre, 4,883,806, Cl. 514-417.000.
Technology Enterprises Company: *See*—
Cutchaw, John M., 4,884,169, Cl. 361-385.000.
Tecnomare S.p.A.: *See*—
Orlando, Crescenzo; Zenere, Sandro; Butera, Antonio; and Beghetto, Leonardo, 4,883,386, Cl. 405-136.000.
Tektronix, Inc.: *See*—
Stanley, James C.; and Diehm, Brian D., 4,884,228, Cl. 364-579.000.
Teleflex, Incorporated: *See*—
Yanusko, David P.; McMillan, Harold C.; and Kline, Edmund G., 4,882,971, Cl. 89-33.020.
Telesis Controls Corporation: *See*—
Robertson, John A., 4,883,291, Cl. 283-117.000.
Teodoridis, Viron; and Joss, Bernard, to ETA SA Fabriques d'Ebauches. Timepiece including an antennaml4,884,252, Cl. 368-10.000.
Terada, Hiroaki; Asada, Katsuhiko; Nishikawa, Hiroaki; Miyata, Souichi; Asano, Hajime; Shimizu, Masahisa; Shima, Kenji; and Komori, Shinji, to Sharp Kabushiki Kaisha; Matsushita Electric Industrial Co., Ltd.; Sanyo Electric Co., Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Information processor capable of data transfer among plural digital data processing units by using an active transmission line having locally controlled storage of dataml4,884,192, Cl. 364-200.000.
Teradyne, Inc.: *See*—
DiPerna, Paul M., 4,884,024, Cl. 324-158.00F.

Teraoka Seiko Co., Limited: *See—*
Denda, Toshio, 4,884,209, Cl. 364-468.000.
Teraoka, Yutaka: *See—*
Yamanouchi, Kenji; Teraoka, Yutaka; Ikeda, Makoto; Nakamura, Masao; and Kawai, Satoshi, 4,884,095, Cl. 355-1.000.
Terashita, Takaaki, to Fuji Photo Film Co., Ltd. Controlling method for a photographic systemml4,884,102, Cl. 355-77.000.
Terauchi, Kenji: *See—*
Murakami, Takuya; Kato, Yoichiro; and Terauchi, Kenji, 4,883,287, Cl. 280-665.000.
Terauchi, Kiyoshi, to Sanden Corporation. Refrigerating system having a compressor with an internally and externally controlled variable displacement mechanismml4,882,909, Cl. 62-209.000.
Terpstra, Daniel A.; and Plume, Steven H., to Emerson Electric Co. Angularly adjustable band sawml4,882,962, Cl. 83-812.000.
Terumo Kabushiki Kaisha: *See—*
Kousai, Tadashi; Ishida, Toshinobu; and Moriuchi, Yousuke, 4,883,468, Cl. 604-164.000.
Teruuchi, Osamu: *See—*
Matsuno, Kenji; Imatani, Tsuneo; Sato, Nobuyuki; Teruuchi, Osamu; and Kurashima, Hideo, 4,883,937, Cl. 219-121.640.
Teshirogi, Toshiyuki, to Alps Electric Co., Ltd. Liquid crystal display element having a Cr_2O_3 thin film for preventing dazzlementml4,883,343, Cl. 350-338.000.
Tessier, Jean: *See—*
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Teva Pharmaceutical Industries Ltd.: *See—*
Kasan, Rodney; Yellin, Haim; and Seiffe, Michael, 4,883,805, Cl. 514-411.000.
Texas Instruments Incorporated: *See—*
Chiu, Edison H.; and Pang, Roland H., 4,884,270, Cl. 371-21.200.
Dennison, Stanley M.; and Prater, Cordell E., 4,884,240, Cl. 365-189.090.
Fattaruso, John W., 4,883,987, Cl. 307-355.000.
Ishida, Yoshihiro; Yoshida, Akira; and Kobayashi, Hideo, 4,883,969, Cl. 250-427.000.
King, Lawrence A.; and Andrews, Peter J., 4,884,039, Cl. 330-253.000.
Szdzepanek, Andre; and Buchanan, George, 4,884,286, Cl. 375-118.000.
Tonooka, Takashi, 4,883,428, Cl. 439-69.000.
Tran, Hiep V., 4,883,979, Cl. 307-446.000.
Texas Instruments Incroporated: *See—*
Gossen, Richard N., Jr.; Bruncke, William C.; and Baker, Gordon D., 4,883,543, Cl. 437-37.000.
Thames Pharmacal Co., Inc.: *See—*
Blackman, Steven T.; and Ralske, Irene, 4,883,660, Cl. 424-78.000.
Thanh, Huy P.: *See—*
Cloetens, Rudolpha C.; Lidy, Werner A.; and Thanh, Huy P., 4,883,832, Cl. 524-265.000.
Thein, Nelson H.: *See—*
Deep, Marguerite E.; and Thein, Nelson H., 4,884,163, Cl. 361-58.000.
Theisen, Jeff J.: *See—*
Fisher, Patrick; Stifelman, Jack; Connelly, John F.; Theisen, Jeff J.; and Fisher, Patrick, 4,883,083, Cl. 137-110.000.
Theisz, Erwin. Method for controlling growth of tissue cellsml4,883,045, Cl. 128-24.00A.
Thiel, Geoffrey L.; Hodgkiss, Douglas H.; and Tohara, Hisanori, to Kabushiki Kaisha Toshiba. System for providing data for an external circuit and related methodml4,884,196, Cl. 364-200.000.
Thiele, Alfred A. Micromagnetic memory packageml4,884,235, Cl. 365-2.000.
Thiele, Hartmut; and Mauser, Heinz, to Agfa-Gevaert Aktiengesellschaft. Suspension device for a containerml4,883,175, Cl. 206-387.000.
Thiele, Hartmut; and Toral, Jose , to Agfa-Gevaert Aktiengessellschaft. Multiple packing for magnetic tapes wound on coresml4,883,178, Cl. 206-391.000.
Thien, Tran V.: *See—*
Grieve, Duncan M. A.; Poon, Stephen S. C.; Thien, Tran V.; Sakizadeh, Kumars; and Weigel, David C., 4,883,747, Cl. 430-542.000.
Thill, Bruce P., to Dow Chemical Company, The. Blend of polycarbonate and polyamide compatibilized with a polyalkyloxazolinem14,883,836, Cl. 525-66.000.
Thiriet, Bernard: *See—*
Lerailler, Eric; Pierre, Michel; Thiriet, Bernard; and Wacquez, Jean, 4,883,478, Cl. 604-360.000.
Thoen, J. A.: *See—*
Marugg, J. E.; Gansow, Michael A. P.; and Thoen, J. A., 4,883,826, Cl. 521-164.000.
Thomas Jefferson University: *See—*
Carabasi, R. Anthony; Jarrell, Bruce E.; and Williams, Stuart K., 4,883,755, Cl. 435-240.200.
Thomas, John S., Jr., to Rampart Packaging, Inc. Thermoplastic bellows lid for thermoplastic containersml4,883,190, Cl. 220-66.000.
Thomas, Ronny D., to Path. Single use injection deviceml4,883,473, Cl. 604-217.000.
Thompson, Bruce R., to Caroma Industries, Ltd. Dual flush cistern mechanismml4,882,793, Cl. 4-324.000.
Thompson, Robert H.: *See—*
Szlaga, Emil; Harris, Robert S.; and Thompson, Robert H., 4,883,103, Cl. 141-368.000.
Thompson, William R.: *See—*
Kaye, Seymour; and Thompson, William R., 4,884,145, Cl. 358-229.000.
Thomson-CSF: *See—*
Lagier, Michel, 4,883,143, Cl. 181-286.000.
Thor S.A.: *See—*
Sardou, Max A., 4,883,289, Cl. 280-684.000.
Thorsman & Co. Aktiebolag: *See—*
Legerius, Bengt E.; and Tjaderhane, Jan P. R., 4,883,921, Cl. 174-87.000.
Thoulon, Pierre-Yves: *See—*
Nourry, Patrick; Husser, Jacques; and Thoulon, Pierre-Yves, 4,884,074, Cl. 341-70.000.
Thow, Ian; and Gupta, Ajay K., to Yale and Valor p.l.c. Gas-fired artificial log fireplace assemblyml4,883,043, Cl. 126-512.000.
Thuer, Ernst: *See—*
Philipp, Leo; Thuer, Ernst; and Ehmig, Gerhard, 4,883,211, Cl. 227-9.000.
Thuries, Edmond; and Masson, Jean-Paul, to Societe Anonyme dite : Alsthom. Electricity stationml4,884,166, Cl. 361-333.000.
Thyssen Stahl Aktiengesellschaft: *See—*
Lax, Hermann; Radtke, Waldemar; and Wyrwas, Karl-Heinz, 4,883,111, Cl. 164-436.000.
TI Interlock Limited: *See—*
Walter, David T., 4,883,084, Cl. 137-118.000.
Tibbitts, Gordon A., to Eastman Christensen. Drag bit for drilling in plastic formation with maximum chip clearance and hydraulic for direct chip impingementml4,883,132, Cl. 175-65.000.
Tietjens, Eduard W., to U.S. Philips Corp. Dry-shaving apparatusml4,882,840, Cl. 30-43.600.
Timmins, Peter; and Payne, Nicholas I. Steroid cream formulationml4,883,792, Cl. 514-169.000.
Timmins, Peter: *See—*
Chow, Wing-Sun; Chen, Shirley C.; and Timmins, Peter, 4,883,785, Cl. 514-31.000.
Tinder, David V., to United Technologies Automotive, Inc. Vehicular door multiplexing systemml4,883,974, Cl. 307-10.100.
Tinder, David V.: *See—*
Basson, Rochford R.; Tinder, David V.; and Wooldridge, George A., 4,882,842, Cl. 29-857.000.
Tir Systems LTD: *See—*
Whitehead, Lorne A., 4,883,341, Cl. 350-276.00R.
Tjaderhane, Jan P. R.: *See—*
Legerius, Bengt E.; and Tjaderhane, Jan P. R., 4,883,921, Cl. 174-87.000.
Tobe, Akihiro: *See—*
Matsuo, Kohtaro; Ezaki, Youichirou; Tobe, Akihiro; Yamazaki, Satoshi; Enda, Kozue; and Kitsukawa, Mariko, 4,883,822, Cl. 514-680.000.
Ninomiya, Kunihiro; Saito, Ken-Ichi; Morita, Shuji; Tobe, Akihiro; and Nitta, Issei, 4,883,802, Cl. 514-278.000.
Tobler, Stephen R. Transmission brakeml4,883,151, Cl. 192-4.00A.
Todd, Harry V. Live bait storage container and method of using sameml4,882,872, Cl. 43-55.000.
Toft, Mark A.: *See—*
Brazdil, James F., Jr.; Glaeser, Linda C.; and Toft, Mark A., 4,883,895, Cl. 558-319.000.
Glaeser, Linda C.; Brazdil, James F., Jr.; and Toft, Mark A., 4,883,896, Cl. 558-319.000.
Togawa, Yoshiaki: *See—*
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.
Tohara, Hisanori: *See—*
Thiel, Geoffrey L.; Hodgkiss, Douglas H.; and Tohara, Hisanori, 4,884,196, Cl. 364-200.000.
Toho Rayon Co., Ltd.: *See—*
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Tokai Rubber Industries, Ltd.: *See—*
Karda, Ryouji, 4,883,260, Cl. 267-140.100.
Tokarz, Stephen P., to ASC Incorporated. Heatable composite backlight panelml4,883,940, Cl. 219-203.000.
Tokico Ltd.: *See—*
Arai, Susumu, 4,883,150, Cl. 188-289.000.
Tokyo Electron Limited: *See—*
Hayakawa, Yuji; and Uchida, Takuo, 4,884,026, Cl. 324-158.00F.
Tokyo Gas Co., Ltd.: *See—*
Morinaga, Akio; Yagi, Isaburo; Maruyama, Hideo; and Yamamoto, Akifumi, 4,883,557, Cl. 156-287.000.
Tokyo Organic Chemical Industries, Ltd.: *See—*
Agui, Wataru; Tamura, Shuji; Kuyama, Hiroshi; Kurachi, Yoshiya; Abe, Masahiko; Kaneko, Yukihiro; and Ogino, Keizo, 4,883,596, Cl. 210-638.000.
Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Egawa, Hideharu; and Suzuki, Yasoji, 4,883,986, Cl. 307-298.000.
Tokyu Car Corporation: *See—*
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Tomida, Katsushi: *See—*
Nozaki, Satoshi; Imai, Shigeo; Ishigami, Makoto; and Tomida, Katsushi, 4,883,709, Cl. 428-288.000.
Tominaga, Akira: *See—*
Kitabatake, Michiharu; and Tominaga, Akira, 4,883,830, Cl. 523-414.000.

Tomita, Itizo; and Matsumoto, Takehide, to Diesel Kiki Co., Ltd. Heater device for motor vehicleml4,883,226, Cl. 237-12.30C.
Tomita, Katsuhiko: *See—*
Kotani, Haruo; Tomita, Katsuhiko; Yada, Takaaki; and Nakanishi, Tsuyoshi, 4,883,563, Cl. 156-645.000.
Tomita, Keiko: *See—*
Miyazima, Koichiro; Tomita, Keiko; and Nakagaki, Masayuki, 4,883,665, Cl. 424-417.000.
Tomita, Koji: *See—*
Kamei, Hideo; Ohbayashi, Masaru; Tomita, Koji; Sugawara, Koko; and Konishi, Masataka, 4,883,758, Cl. 435-253.500.
Tomita, Sigeo: *See—*
Harada, Eiji; Matsuzaki, Hitoshi; Tomita, Sigeo; and Chida, Katsunori, 4,884,126, Cl. 357-81.000.
Tomma, Kauko: *See—*
Saukkonen, Seppo; and Tomma, Kauko, 4,883,233, Cl. 242-66.000.
Tomminen, Hannu, to Parma Oy. Slip-form casting machine for fabrication of elongated concrete productsml4,883,416, Cl. 425-64.000.
Tonel, Valerio: *See—*
Sartor, Mariano; and Tonel, Valerio, 4,882,857, Cl. 36-120.000.
Tonooka, Takashi, to Texas Instruments Incorporated. Test socket incorporating circuit elementsml4,883,428, Cl. 439-69.000.
Top Kogyo Co., Ltd.: *See—*
Sakai, Yuichi, 4,882,959, Cl. 81-416.000.
Toral, Jose : *See—*
Thiele, Hartmut; and Toral, Jose , 4,883,178, Cl. 206-391.000.
Toratani, Hisayoshi: *See—*
Lee, Huai-Chuan; Toratani, Hisayoshi; and Meissner, Helmuth E., 4,883,523, Cl. 65-30.140.
Torii, Nozomu: *See—*
Asada, Toru; Komuro, Kenichi; Fukumoto, Ryoichi; and Torii, Nozomu, 4,884,207, Cl. 364-431.030.
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Hipple, James E.; Dionne, Gerald L.; Torii, Yasuhiro; Shimada, Masaru; and Watanabe, Iwao, 4,883,968, Cl. 250-423.00R.
Torrington Company, The: *See—*
Rhoads, Thomas G.; and Cornish, Paul M., 4,883,374, Cl. 384-618.000.
Toshiba Machine Co., Ltd.: *See—*
Itoh, Hiroshi, 4,884,014, Cl. 318-600.000.
Toshimitsu, Kazushige; Ueno, Masayuki; and Igarashi, Hisashi, to Honda Giken Kogyo Kabushiki Kaisha. Fuel supply control method for internal combustion enginesml4,883,039, Cl. 123-463.000.
Toshiya, Natsuhara: *See—*
Yuji, Enoguchi; Toshiya, Natsuhara; and Masashi, Yamamoto, 4,883,017, Cl. 118-653.000.
Tosoh Corporation: *See—*
Sato, Masatoshi; Ogawara, Kensuke; and Emura, Noriaki, 4,883,702, Cl. 428-141.000.
Total Environmental Services Technology, Inc.: *See—*
Brown, Robert L., 4,882,929, Cl. 73-49.200.
Tottori, Takafumi: *See—*
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Touze, Eric, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation "SNECMA". Screwed attachment of a body of revolution to an annular flange in a turbine enginesml4,883,407, Cl. 415-190.000.
Townsend, Ensley E., to Eastman Kodak Company. Automatic adjustment of focal length to obtain desired optical reduction ratio in a microfilm cameraml4,884,099, Cl. 355-55.000.
Toya, Hiroo: *See—*
Kitamura, Shuji; Okumura, Takuzo; Tadokoro, Yoshio; Toya, Hiroo; Togawa, Yoshiaki; Kikuchi, Toshitsugu; Ohmae, Tadayuki; Okada, Mitsuyuki; Nishihara, Minoru; Shiota, Toshiaki; and Nagai, Hiroyuki, 4,883,717, Cl. 428-458.000.
Toyo Seikan Kaisha, Ltd.: *See—*
Matsuno, Kenji; Imatani, Tsuneo; Sato, Nobuyuki; Teruuchi, Osamu; and Kurashima, Hideo, 4,883,937, Cl. 219-121.640.
Toyoshima, Akira, to Stanley Electric Co., Ltd. Wedge-base lamp and socket assemblyml4,883,434, Cl. 439-619.000.
Toyota Jidosha Kabushiki Kaisha: *See—*
Kashihara, Yuji; Taga, Yutaka; and Kubo, Seitoku, 4,882,952, Cl. 74-867.000.
Sugitani, Tatsuo; Uchida, Kiyoyuki; and Inoue, Hideo, 4,883,326, Cl. 303-110.000.
Tanahashi, Toshio; Kanamaru, Masanobu; Itoh, Toshio; and Itoh, Kazuhiro, 4,883,030, Cl. 123-193.0CH.
Watanabe, Masao, 4,884,227, Cl. 364-565.000.
TPV Energy Systems, Inc.: *See—*
Diederich, Walter J.; and Nelson, Robert E., 4,883,619, Cl. 264-60.000.
Tracy, David J.: *See—*
Login, Robert B.; Chaudhuri, Ratan K.; Tracy, David J.; and Helioff, Michael W., 4,883,655, Cl. 424-70.000.
Tran, Hiep V., to Texas Instruments Incorporated. Darlington BiCMOS driver circuitml4,883,979, Cl. 307-446.000.
TransData, Inc.: *See—*
Hammond, Scott H.; Kirk, Ronald L.; and Francis, Eric R., 4,884,021, Cl. 324-142.000.
Treurnicht, Ilse: *See—*
Guillet, James E.; Treurnicht, Ilse; and Li, Ruey S., 4,883,857, Cl. 528-272.000.
Trevizo, Jose. Pedal extension deviceml4,882,945, Cl. 74-594.300.
Trihard, S.A.: *See—*
McDermott, Daniel R., 4,883,157, Cl. 193-34.000.
Truckenbrod, Thomas G.: *See—*
Jasper, Edward P.; and Truckenbrod, Thomas G., 4,882,899, Cl. 56-220.000.
Truesdale, R. Grant, Jr.: *See—*
Uken, David; Truesdale, R. Grant, Jr.; and Swan, Daniel L., 4,883,431, Cl. 439-521.000.
Trujillo, David A.; McMahon, William A., Jr.; and Lyle, Robert E., Jr., to Southwest Research Institute. Polymeric decontamination compositionml4,883,608, Cl. 252-189.000.
Trujillo, William R., to Eastman Christensen Co. Large compact cutter rotary drill bit utilizing directed hydraulics for each cutterml4,883,136, Cl. 175-339.000.
Tsang, Peter; Rhee, Seong; Jacko, Michael; and Kubik, James, to Allied-Signal Inc. Polymeric membrane air separator for a turbocharger and brake system in a vehicleml4,883,023, Cl. 123-25.00A.
Tsuboi, Kinji: *See—*
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Tsuboyama, Akira: *See—*
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Tsuburaya, Toshihiko: *See—*
Kasai, Yoichi, deceased; Kawamura, Akio; Nakanishi, Yoshimi; Kakita, Akira; Tsuburaya, Toshihiko; Kuraoka, Yasuo; and Sakao, Nobuo, 4,883,452, Cl. 600-36.000.
Tsuchihashi, Hironori: *See—*
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Tsuge, Akihiko: *See—*
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Tsuji, Kazutaka: *See—*
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Tsuji, Kiyoshi; Kimura, Kenji; and Okada, Yoshihiro, to Olympus Optical Co., Ltd. Video endoscope apparatus employing device shutterml4,884,134, Cl. 358-98.000.
Tsujimura, Osamu; Arai, Tatsuo; and Okawa, Masayuki, to Mitsubishi Kinzoku Kabushiki Kaisha. Ball end millml4,883,391, Cl. 407-40.000.
Tsumita, Norikazu: *See—*
Shiroishi, Yoshihiro; Hishiyama, Sadao; Suzuki, Hiroyuki; Ohno, Tomoyuki; Matsuda, Yoshibumi; Takagi, Kazumasa; Tsumita, Norikazu; Kitazaki, Yasushi; Ohura, Masaki; and Nagaike, Sadanori, 4,883,711, Cl. 428-336.000.
Tsurubuchi, Yasuo; and Kato, Shogo, to Konishiroku Photo Industry Co., Ltd. Sheet conveyance apparatusml4,884,110, Cl. 355-319.000.
Tsutsui, Hiroshi; Baba, Sueki; Ohmori, Koichi; Ohtsuchi, Tetsuro; and Watanabe, Masanori, to Matsushita Electric Industrial Co., Ltd. Radiation detector and method of manufacturing the sameml4,883,967, Cl. 250-370.010.
Turner, Barry S.: *See—*
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Turngren, Christina M. Method for forming foam braced packagingml4,883,555, Cl. 156-227.000.
Tyers, Michael B., to Glaxo Group Limited. Treatment of anxietyml4,883,803, Cl. 514-304.000.
U.S.E. Diamond, Inc.: *See—*
Shamah, Alfred A.; and Schroeder, James R., 4,883,396, Cl. 411-55.000.
UBE Industries Ltd.: *See—*
Yasuno, Hiroshi; Sakatani, Fumio; and Kanda, Takeshi, 4,883,575, Cl. 204-198.000.
Uchida, Kiyoyuki: *See—*
Sugitani, Tatsuo; Uchida, Kiyoyuki; and Inoue, Hideo, 4,883,326, Cl. 303-110.000.
Uchida, Naoshi: *See—*
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Uchida, Takuo: *See—*
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Onodera, Fumio; Uchimi, Hiroshi; and Koseki, Toshio, 4,883,671, Cl. 425-122.000.
Uchino, Kenji; and Ohnishi, Kazumasa, to Alps Electric Co., Ltd. Shock preventing apparatusml4,883,248, Cl. 248-550.000.
Uchiyama, Masayuki: *See—*
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Ueda, Hiroshi: *See—*
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Taniguchi, Nobuyuki; Hata, Yoshiaki; Kudo, Yoshinobu; Inoue, Manabu; Hoda, Takeo; and Ueda, Hiroshi, 4,884,089, Cl. 354-222.000.

Ueda, Masanori; Abe, Masayuki; Shitani, Kensai; Yoshimoto, Tetsuo; Yamamoto, Hiroki; and Kurosawa, Fumio, to Nippon Steel Corporation. Process for preparation of austenitic stainless steel having excellent seawater resistancem14,883,544, Cl. 148-2.000.
Ueda, Tsunehisa: *See—*
Hamaguchi, Tetsuo; Ueda, Tsunehisa; and Natsuume, Tadao, 4,883,535, Cl. 106-93.000.
Uekido, Kouzou: *See—*
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Uemura, Hiromi: *See—*
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Ueno, Fumio: *See—*
Kasori, Mituo; Shinozaki, Kazuo; Anzai, Kazuo; Tsuge, Akihiko; Imagawa, Hiroshi; Takano, Takeshi; Ueno, Fumio; Horiguchi, Akihiro; and Inoue, Hiroshi, 4,883,780, Cl. 501-96.000.
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Uken, David; Truesdale, R. Grant, Jr.; and Swan, Daniel L., to Raychem Corporation. Gel-filled cap memberml4,883,431, Cl. 439-521.000.
Ullman, Edwin F.: *See—*
Houts, Thomas M.; and Ullman, Edwin F., 4,883,688, Cl. 427-285.000.
Umehara, Kazuhiro, to Suzuki Jidosha Kogyo Kasbushiki Kaisha. Float switch, a control apparatus and a warning apparatus of an enginem14,883,928, Cl. 200-81.90M.
Umeki, Yoshitaka, to NEC Corporation. ECL-TTL level converterml4,883,990, Cl. 307-473.000.
Uni-Charm Corporation: *See—*
Nozaki, Satoshi; Imai, Shigeo; Ishigami, Makoto; and Tomida, Katsushi, 4,883,709, Cl. 428-288.000.
Union Carbide Chemicals and Plastics Company Inc.: *See—*
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Union Carbide Corporation: *See—*
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United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
Elliott, Charles T., 4,883,962, Cl. 250-334.000.
United States of America
Air Force: *See—*
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Walker, Aian, 4,883,405, Cl. 415-137.000.
Army: *See—*
Au Coin, Thomas R.; Braddock IV, Walter D.; and Iafrate, Gerald J., 4,883,769, Cl. 437-110.000.
Holderfield, Daron C.; Martin, Bernard E.; and Russell, Samuel S., 4,884,027, Cl. 324-158.00F.
LaPensee, Kenneth R., 4,884,032, Cl. 324-504.000.
Schwartzman, Alvin, 4,882,993, Cl. 102-218.000.
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Health and Human Services: *See—*
Keith, Jerry M.; and Locht, Camille, 4,883,761, Cl. 435-320.000.
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Krol, Thijs; and Van Gils, Willibrordus J., 4,884,194, Cl. 364-200.000.
Kroner, Klaus G.; and Wolber, Jorg, 4,883,991, Cl. 307-491.000.
Patron, Christian S. A. E.; Sowinski, Eugene J.; and Huben, Aart P., 4,884,043, Cl. 331-186.000.
Pesque, Patrick R.; and Bonnefous, Odile M. A., 4,883,060, Cl. 128-660.010.
Tietjens, Eduard W., 4,882,840, Cl. 30-43.600.
United Steel & Wire Company: *See—*
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United Technologies Automotive, Inc: *See—*
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United Technologies Automotive, Inc.: *See—*
Kulis, Lawrence J., 4,883,312, Cl. 296-214.000.
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United Technologies Corporation: *See—*
Sacks, Robert N.; and Tanski, William J., 4,884,001, Cl. 310-313.00A.
Swindal, James L.; and Grantham, Daniel H., 4,883,768, Cl. 437-61.000.
Universite Paris-Nord: *See—*
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University of British Columbia: *See—*
Levy, Julia G.; Dolphin, David; and Chow, Jack K., 4,883,790, Cl. 540-145.000.
University of Chicago: *See—*
Yang, Nien-chu C., 4,883,898, Cl. 558-427.000.
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Boyle, Michael D. P.; and Yarnall, Michele, 4,883,754, Cl. 435-177.000.
University of Illinois, The Board of Trustees of the: *See—*
Zeimer, Ran C., 4,883,061, Cl. 128-665.000.
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Berry, John P.; and Annis, David, 4,883,453, Cl. 600-36.000.
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Fogarty, Kevin E.; Fay, Fredric S.; Isenstein, Louise M.; and Coggins, James M., 4,884,225, Cl. 364-559.000.
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Chiarulli, Donald M.; Melhem, Rami; and Levitan, Steven P., 4,883,334, Cl. 350-96.130.
University of Toronto Innovations Foundations: *See—*
Sandham, H. J.; and Balanyk, Thomas E., 4,883,534, Cl. 106-35.000.
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UOP: *See—*
Burk, Emmett H., Jr.; Yoo, Jin S.; and Radlowski, Cecelia A., 4,883,783, Cl. 502-304.000.
Uphues, Guenter: *See—*
Veitenhansl, Rudolf; Waltenberger, Peter; Lange, Fritz; Uphues, Guenter; and Ploog, Uwe, 4,883,604, Cl. 252-8.900.
Upjohn Company, The: *See—*
Kim, Kyoung S., 4,883,869, Cl. 540-355.000.
Uppstrom, Russell E. Hingeml4,882,809, Cl. 16-384.000.
Urman, Robert; Brisson, Alfred G.; and Nowacki, Cristopher, to Nortgate Research, Inc. Circuit providing indication of air entrapment in patient's lungsml4,883,050, Cl. 128-202.270.
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Ushijima, Ryosuke: *See—*
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Vacco Industries: *See—*
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Vacha, Lubos J. B.; Monyihan, Cornelius T.; and Schultz, Peter C., to Spectran Corporation. Oxide coatings for fluoride glassml4,883,339, Cl. 350-96.340.
Valentino, Frank; Betts, David E.; and Alesch, Edward A., to B-V Dough Handling Systems, Inc. Dough processing apparatusml4,883,361, Cl. 366-97.000.
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Valia, Kirti H.: *See—*
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Vanderbilt University: *See*—
Field, Lamar; Musallam, Hikmat A.; Macke, Jeffrey D.; and Srivastava, Pramod K., 4,883,890, Cl. 558-61.000.
Van der Woude, Gerbrig W.; and Moore, Timothy M., to Polyco, Inc. Cover with integral fastening meansml4,883,394, Cl. 411-51.000.
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Van Heuvelen, Jan H.: *See*—
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Van Hout, James E.; and Dziekan, Lee M., to Chrysler Motors Corporation. Linkage-type switches for control panel actuatorsml4,883,932, Cl. 200-339.000.
VanKuiken, Lewis L., Jr.; and Hanson, Dale A., to Progressive Blasting Systems, Inc. Robot positioner and seal arrangement for a closed chamberml4,882,881, Cl. 51-426.000.
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Vanommeren, James. Method and system for filling liquid cylindersml4,883,099, Cl. 141-1.000.
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Berkhout, Ronald; Van Stiphout, Johannes G. V.; Corver, Jozef; A. W. M.; Hoep, Antoon L.; and Knapen, Berend J., 4,884,188, Cl. 346-160.100.
Van Trump, James E.: *See*—
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Varner, Horace M.; and Stech, Ernest L., to Frost Engineering Development Corporation. Descent control device with deadman brakeml4,883,146, Cl. 182-5.000.
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Veitenhansl, Rudolf; Waltenberger, Peter; Lange, Fritz; Uphues, Guenter; and Ploog, Uwe, to Henkel Kommanditgesellschaft auf Aktien. Smoothing compositions for textile fibers containing dialkyl ethers of (poly)alkylene glycolsml4,883,604, Cl. 252-8.900.
Veltman, Preston L.; and Hansen, Ove. Particulate fuel components for solid propellant systemsml4,882,994, Cl. 102-290.000.
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Maxim, Peter E.; and Veltri, Robert W., 4,883,813, Cl. 514-470.000.
Verbrugge, Mark W.; and Carpenter, Michael K., to General Motors Corporation. Method of plating metallo-gallium filmsml4,883,567, Cl. 204-39.000.
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Stutsman, Richard, 4,884,212, Cl. 364-479.000.
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Neiman, Richard D., 4,883,165, Cl. 198-682.000.
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Vetter, Manfred. Apparatus for sealing pipeml4,883,094, Cl. 138-89.000.
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Vincent, Ray T. Auto-dump flow controllerml4,882,792, Cl. 4-323.000.
Vinod, Yashavant; V.: *See*—
Fitzgerald, Patrick H.; Rao, Nandakumar S.; Vinod, Yashavant; V.; and Alender, Jeffrey R., 4,883,839, Cl. 525-136.000.
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Fontenot, Mark G., 4,883,046, Cl. 128-25.00R.
Voest-Alpine Automotive Gesellschaft mbH: *See*—
Seibt, Artur; and Kainz, Alois, 4,884,204, Cl. 364-431.030.
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Vohl, Hans-Jurgen, to Metzeler GmbH. Torsional vibration dampерml4,882,944, Cl. 74-574.000.
Voigt, Wallace D. Combination rear dump and bottom dump semi trailerml4,883,321, Cl. 298-17.700.
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Voneiff, John. Method and apparatus for cleaning containersml4,883,542, Cl. 134-21.000.
Von Maessenhausen, Walter; Czikkely, Vilmos; and Jung, Johann, to BASF Aktiengesellschaft. Use of ammonium syngenite as a slow-acting nitrogen fertilizerml4,883,530, Cl. 71-36.000.
Voss, Hartwig; and Bruecken, Thomas, to BASF Aktiengesellschaft. Removal of acid from cathodic electrocoating baths by electrodialysisml4,883,573, Cl. 204-182.400.
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Vydrzal, William J.; and Vydrzal, William S. Water-stabilized sprinklerml4,883,228, Cl. 239-279.000.
Vydrzal, William S.: *See*—
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Burysek, Frantisek; Jirka, Bohuslav; Jarolimek, Zdenek; and Fajt, Ludvik, 4,883,231, Cl. 242-35.50A.
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Bossler, Hans J.; Enders, Peter; Boxhammer, Jorg; Rudolph, Bernd; and Sebralla, Bruno, 4,884,008, Cl. 315-152.000.
W. Industries Limited: *See*—
Waldren, Jonathan D., 4,884,219, Cl. 364-514.000.
W. R. Grace & Co.-Conn.: *See*—
Havens, Marvin R.; and Lovin, Joseph R., 4,882,894, Cl. 53-461.000.
Wackrow, Roger D., to BSA Guns (UK) Limited. Air gunsml4,883,042, Cl. 124-67.000.
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Wahl, Arthur A. Liquid pumping systemml4,883,202, Cl. 222-109.000.
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Waldren, Jonathan D., to W. Industries Limited. Method and apparatus for the perception of computer-generated imageryml4,884,219, Cl. 364-514.000.
Walker, Alan, to United States of America, Air Force. Turbine nozzle mounting arrangementml4,883,405, Cl. 415-137.000.
Walker, Craig I., to Warman International Limited. Impellers for centrifugal pumpsml4,883,403, Cl. 415-98.000.
Walker, Frank H. Hydraulic wheel motor and pumpml4,883,141, Cl. 180-243.000.
Walker, James W. Automotive safety device for side lightingml4,884,172, Cl. 362-61.000.
Walker, Richard C., to Hewlett-Packard Company. Fully integrated high-speed voltage controlled ring oscillatorml4,884,041, Cl. 331-57.000.
Wallace, David N.: *See*—
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Wallbillitch, Guenter; and Van Heuvelen, Jan H., to BASF Aktiengesellschaft. Seamless and firm joining of the end and/or lateral areas of photosensitive layersml4,883,742, Cl. 430-275.000.
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Hardy, Thomas A.; and Walsh, Edward N., 4,883,892, Cl. 558-164.000.
Waltenberger, Peter: *See*—
Veitenhansl, Rudolf; Waltenberger, Peter; Lange, Fritz; Uphues, Guenter; and Ploog, Uwe, 4,883,604, Cl. 252-8.900.
Walter, David T., to TI Interlock Limited. Pressure fluid control systemml4,883,084, Cl. 137-118.000.
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Wanie, Lee J.; Behrens, Robert N.; DeBraal, Stanley J.; and Bedis, Michael, to Deere & Company. System and method for controlling the ground speed and enhancing the maneuverability of an off-road vehicleml4,883,137, Cl. 180-6.340.
Ward, Gary H.: *See*—
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Warman International Limited: *See*—
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Warner, R. Brown; and Scheider, Alfred F., to Jason, Inc. Flexible abrasive grinding toolml4,882,879, Cl. 51-337.000.
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Watanabe, Junji, to Kabushiki Kaisha Toshiba. Image forming apparatus for blanking portions of a documentml4,884,107, Cl. 355-218.000.
Watanabe, Keiichiro; and Ohashi, Tsuneaki, to NGK Insulators, Ltd. Heat resisting low expansion zirconyl phosphate-zircon compositeml4,883,781, Cl. 501-102.000.
Watanabe, Masanori: *See*—
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Watanabe, Masao; and Nagase, Hiroshi, to Fujikura Kasei Co., Ltd. Negatively chargeable toner for use in dry electrophotographyml4,883,735, Cl. 430-109.000.
Watanabe, Masao, to Toyota Jidosha Kabushiki Kaisha. Speed detecting apparatus for a vehicleml4,884,227, Cl. 364-565.000.
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Waterman, Dewey J., to United Steel & Wire Company. Elastomeric vertical corner bumper for shopping cartml4,883,281, Cl. 280-33.992.
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Weatherford, James R.; and Kimmel, Arthur T., to Convex Computer Corporation. Memory array unit for computerml4,884,191, Cl. 364-200.000.
Weathers, John B.; Mitchell, Paul B., Jr.; Sampson, Coy L.; and Hubbs, Charles B. Carpet shearing apparatusml4,882,818, Cl. 26-15.00R.
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Yarnall, Michele: *See*—
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Yashiki, Seiji; Hirano, Hiroshi; and Sasaki, Kazutomo, to Mazda Motor Corporation. Engine idling speed control systemml4,883,034, Cl. 123-339.000.
Yasuda, Minoru: *See*—
Takemoto, Masayuki; Nagura, Osamu; Nomura, Yukio; and Yasuda, Minoru, 4,883,858, Cl. 528-322.000.
Yasuno, Hiroshi; Sakatani, Fumio; and Kanda, Takeshi, to UBE Industries Ltd.; and Meiko Electronics Company, Ltd. Apparatus for continuously producing a base for a printed circuit boardml4,883,575, Cl. 204-198.000.
Yates, Victor: *See*—
Sero, Samuel J.; Collins, James S.; and Yates, Victor, 4,882,891, Cl. 52-742.000.
Yatomi, Takeshi; and Tanaka, Makoto, to Mitsubishi Denki Kabushiki Kaisha. Traveling wire electroerosion machineml4,883,933, Cl. 219-69.120.
Yatsunami, Kenroh, to Sharp Kabushiki Kaisha. Image display systemml4,884,146, Cl. 358-400.000.
Yazaki Corporation: *See*—
Ikeda, Kimihiko, 4,884,058, Cl. 340-461.000.
Yee, Phillip D.: *See*—
Drewes, Douglas A.; and Yee, Phillip D., 4,883,154, Cl. 192-98.000.
Yellin, Haim: *See*—
Kasan, Rodney; Yellin, Haim; and Seiffe, Michael, 4,883,805, Cl. 514-411.000.
Yokohama Rubber Co., Ltd., The: *See*—
Ogawa, Hiroyasu; Kogo, Yasuo; Takahashi, Shuji; and Suzuki, Yasuo, 4,883,712, Cl. 428-367.000.
Takahashi, Ken; and Kabe, Kazuyuki, 4,883,108, Cl. 152-531.000.
Yokoi, Takeshi: *See*—
Kanno, Masahide; Yabe, Hisao; Yokoi, Takeshi; Yoshinaga, Jun; and Ohzeki, Kazuhiko, 4,884,133, Cl. 358-98.000.
Yokomori, Sadakazu: *See*—
Nakatsuka, Shin-ichi; Hayashi, Masatoshi; Yokomori, Sadakazu; Nakashima, Yoshimoto; Hatayama, Katsuo; and Araki, Hiroaki, 4,883,876, Cl. 546-51.000.
Yokota, Hiroshi: *See*—
Koashi, Katsue; and Yokota, Hiroshi, 4,883,953, Cl. 250-226.000.
Yokota, Minoru; Nagata, Masayuki; Saito, Shigeo; and Yamada, Yuichi, to Sumitomo Electric Industries, Ltd. Composite superconductor and method of the production thereofml4,883,922, Cl. 174-125.100.
Yokoyama, Masaaki: *See*—
Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, 4,883,6 /9, Cl. 546-280.000.
Yokoyama, Shotaro; and Nishinbe, Takashi, to Fuji Electric Company Ltd. Method and system for detecting whether an optical system is in focus using an improved interpolation techniqueml4,883,951, Cl. 250-201.000.
Yokoyama, Toyohiko: *See*—
Azukizawa, Teruo; Morishita, Mimpei; Yokoyama, Toyohiko; Takaki, Shigeo; Yuyama, Yoshio; and Noda, Akitaka, 4,882,999, Cl. 104-281.000.
Yoo, Jin S.: *See*—
Burk, Emmett H., Jr.; Yoo, Jin S.; and Radlowski, Cecelia A., 4,883,783, Cl. 502-304.000.
Yoon, Cheol-min: *See*—
Taylor, Edward C.; and Yoon, Cheol-min, 4,883,799, Cl. 514-258.000.
Yoshida, Akira: *See*—
Ishida, Yoshihiro; Yoshida, Akira; and Kobayashi, Hideo, 4,883,969, Cl. 250-427.000.
Yoshida Industry Co., Ltd.: *See*—
Sakamaki, Yosio; Ideshita, Yuji; Fujita, Fumiyoshi; and Sugiyama, Takashi, 4,883,079, Cl. 132-318.000.
Yoshida, Susumu: *See*—
Ogawa, Hiroshi; and Yoshida, Susumu, 4,884,202, Cl. 364-424.010.
Yoshida, Tadahiro: *See*—
Kitaura, Mashio; Nakai, Masaaki; Yoshida, Tadahiro; Kikukawa, Yoshiiku; Omaki, Takanobu; and Taniguchi, Nobuyuki, 4,884,094, Cl. 354-412.000.
Yoshida, Tadashi, to Canon Kabushiki Kaisha. Image forming apparatus having multiple image information inputsml4,884,104, Cl. 355-202.000.
Yoshida, Toshio: *See*—
Mochida, Mitsuyoshi; Maekawa, Tokuo; Takei, Hisashi; Matsumoto, Yasuo; Ohmura, Hiroshi; Sugimoto, Shigeru; Ushiro, Seimei; Asano, Seiji; and Yoshida, Toshio, 4,884,087, Cl. 354-75.000.
Yoshikawa, Eiichi, to Laurel Bank Machines Co. Ltd. Foreign substance disposing device for money receiving and disbursing machineml4,883,181, Cl. 209-534.000.
Yoshikawa, Eiichi; Shinozaki, Takashi; and Ito, Takahiko, to Laurel Bank Machines Co., Ltd. Bill disbursing systemml4,883,264, Cl. 271-110.000.

Yoshimoto, Tetsuo: *See*—
Ueda, Masanori; Abe, Masayuki; Shitani, Kensai; Yoshimoto, Tetsuo; Yamamoto, Hiroki; and Kurosawa, Fumio, 4,883,544, Cl. 148-2.000.

Yoshimura, Tsunenori: *See*—
Murase, Takao; and Yoshimura, Tsunenori, 4,883,947, Cl. 219-553.000.

Yoshinaga, Jun: *See*—
Kanno, Masahide; Yabe, Hisao; Yokoi, Takeshi; Yoshinaga, Jun; and Ohzeki, Kazuhiko, 4,884,133, Cl. 358-98.000.

Yoshinaga, Kazuo: *See*—
Okada, Shinjiro; Yoshinaga, Kazuo; Taniguchi, Osamu; Kawagishi, Hideyuki; Tsuboyama, Akira; Hanyu, Yukio; Yamashita, Masataka; and Katagiri, Kazuharu, 4,883,344, Cl. 350-339.00R.

Yoshino, Kunihisa: *See*—
Shoji, Hisashi; Haneda, Satoshi; and Yoshino, Kunihisa, 4,884,149, Cl. 358-300.000.

Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Gohbayashi, Masayoshi; Narita, Noritsugu; and Maruno, Makoto, 4,883,902, Cl. 560-75.000.

Yoshiyama, Kimitaka: *See*—
Enomoto, Hiromu; Dohgome, Hirofumi; Kumagai, Masao; Nakamura, Toru; and Yoshiyama, Kimitaka, 4,883,975, Cl. 307-290.000.

Yoshizato, Katsutoshi; Taira, Toshio; and Miyata, Teruo, to Koken Co., Ltd. Method of producing an artifical skinml4,883,487, Cl. 623-15.000.

Young, Deborah A. Cosmetic preparationml4,883,654, Cl. 424-69.000.

Young, William I., to Hy-Con Products, Inc. Container for static-sensitive articlesml4,883,172, Cl. 206-328.000.

Yu, Ho: *See*—
Jacoby, John E.; Yu, Ho; and Ramser, Robert A., 4,882,831, Cl. 29-527.500.

Yuchi, Sadataka: *See*—
Nagashima, Tetsuya; Matsushita, Eiji; Yuchi, Sadataka; and Kitajima, Akira, 4,884,222, Cl. 364-550.000.

Yuji, Enoguchi; Toshiya, Natsuhara; and Masashi, Yamamoto, to Minolta Camera Kabushiki Kaisha. Developing devicesml4,883,017, Cl. 118-653.000.

Yukutomo, Masashi: *See*—
Kishi, Hajimu; Tanaka, Kunio; Yukutomo, Masashi; and Matsumura, Teruyuki, 4,884,211, Cl. 364-474.220.

Yuri, Hideki: *See*—
Ikeuchi, Satoru; Arai, Mitutaka; Okuyama, Yuki; Yuri, Hideki; Shiohara, Tomoo; and Oyama, Yasuhiko, 4,883,734, Cl. 430-109.000.

Yushiro Chemical Industry Co., Ltd.: *See*—
Kuwamoto, Hiroshi; Iwado, Shuichi; Koga, Yoichi; Izushi, Tomoya; Muto, Toshimi; and Kuroi, Nobuomi, 4,883,606, Cl. 252-32.500.

Yuyama, Yoshio: *See*—
Azukizawa, Teruo; Morishita, Mimpei; Yokoyama, Toyohiko; Takaki, Shigeo; Yuyama, Yoshio; and Noda, Akitaka, 4,882,999, Cl. 104-281.000.

Zabinski, Siegfried; Biervert, Klaus; and Kupper, Gerd, to Durkopp Systemtechnik GmbH. Cutting portal of an ultra-high pressure fluid jet cutting systemml4,882,961, Cl. 83-177.000.

Zabrocki, Vincent S., to Dow Chemical Company, The. Compatible blends of polyolefins with thermoplastic polyurethanesml4,883,837, Cl. 525-66.000.

Zama, Yoshiyuki; Ishiyama, Nobuo; Saita, Tsuneo; Naito, Takanobu; Hirose, Masao; Yokoyama, Masaaki; Asano, Taiji; Senda, Hisato; Sekine, Keiji; and Sanai, Shigeru, to Kaken Pharmaceutical Co., Ltd. Cephalosporin compounds, processes for their preparation and antibacterial agentsml4,883,879, Cl. 546-280.000.

Zamitter, Mikhail N. Zamitter blade springml4,883,261, Cl. 267-158.000.

Zanetti, Paul H. Technique for removing deposits from body vesselsml4,883,460, Cl. 604-22.000.

Zanoni, Carl A.; and Field, Alan H., to Zygo Corporation. Dual high stability interferometerml4,883,357, Cl. 356-349.000.

Zappia, Vincenzo; and De Rosa, Mario, to Arval S.p.A. Cosmetic preparations containing ubidecarenonesml4,883,670, Cl. 424-450.000.

Zardi, Umberto, to Ammonia Casale S.A. System and device to make catalytic basket wallsfor heterogeneous synthesis reactorsml4,883,646, Cl. 422-311.000.

Zaslavsky, Gregory: *See*—
Barakitis, Nikolaos; and Zaslavsky, Gregory, 4,882,835, Cl. 29-622.000.

Zboralski, James A.; Hock, Darryl A.; and Kaleita, David L., to Jabil Circuit Company. Airflow sensor and control circuitml4,884,215, Cl. 364-510.000.

Zeimer, Ran C., to University of Illinois, The Board of Trustees of the. Method and apparatus for measuring the thickness of eye componentsml4,883,061, Cl. 128-665.000.

Zenere, Sandro: *See*—
Orlando, Crescenzo; Zenere, Sandro; Butera, Antonio; and Beghetto, Leonardo, 4,883,386, Cl. 405-136.000.

Zenith Electronics Corporation: *See*—
Prazak, Charles J., III, 4,884,006, Cl. 313-474.000.

Zenk, Meinhart H.: *See*—
Grill, Erwin; Winnacker, Ernst-Ludwig; and Zenk, Meinhart H., 4,883,861, Cl. 530-326.000.

Zeroni, Ludwig: *See*—
Pertzsch, Albert; Brunner, Hubert; and Zeroni, Ludwig, 4,884,158, Cl. 360-132.000.

Zerwekh, Joseph E.: *See*—
Pak, Charles Y. C.; Uskokovic, Milan R.; and Zerwekh, Joseph E., 4,883,791, Cl. 514-167.000.

Zeutschel GmbH & Company: *See*—
Bohmig, Wolfgang, 4,884,093, Cl. 354-299.000.

Zimble, Alan W. Dental probe assemblyml4,883,425, Cl. 433-32.000.

Zimmer, Gero, to Productech Reflow Solder Equipment Inc. Heated tool with heated supportml4,883,214, Cl. 228-9.000.

Zukovics nee Sumeg, Katalin: *See*—
Petocz, Lujza; Simonyi, Istvan; Beck, Ivan; Gigler, Gabor; Fekete, Marton; Szirt nee Kiszelly, Eniko ; Mandi, Attila; Gorgenyi, Frigyes; Dietz, Andras; Jakfalvi, Elemer; Zukovics nee Sumeg, Katalin; Gado, Klara; and Hegedus, Maria, 4,883,798, Cl. 514-256.000.

Zunkel, Gary D.; Beck, H. Kent; and Christensen, Jon B., to Halliburton Company. Above packer perforate, test and sample tool and method of useml4,883,123, Cl. 166-264.000.

Zwart, Klaas, to Petroline Wireline Services Limited. Downhole lock assemblyml4,883,121, Cl. 166-217.000.

Zygo Corporation: *See*—
Zanoni, Carl A.; and Field, Alan H., 4,883,357, Cl. 356-349.000.

501 Vestec Corporation: *See*—
Vestal, Marvin L., 4,883,958, Cl. 250-288.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 28TH DAY OF NOVEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Arvin Industries, Inc.: *See*—
Scheitlin, George E.; Sickels, Mark A.; and Usleman, Robert T., Re. 33,118, Cl. 60-299.000.

Baker, Daniel A., to Whirlpool Corporation. Selective temperature control systemmlRe. 33,119, Cl. 374-102.000.

Hitachi, Ltd.: *See*—
Nagae, Yoshiharu; Isogai, Masato; Kawakami, Hideaki; and Nakano, Fumio, Re. 33,120, Cl. 350-350.00S.

Idacon, Inc.: *See*—
Kirchner, Roy P., Re. 33,121, Cl. 427-440.000.

Isogai, Masato: *See*—
Nagae, Yoshiharu; Isogai, Masato; Kawakami, Hideaki; and Nakano, Fumio, Re. 33,120, Cl. 350-350.00S.

Kawakami, Hideaki: *See*—
Nagae, Yoshiharu; Isogai, Masato; Kawakami, Hideaki; and Nakano, Fumio, Re. 33,120, Cl. 350-350.00S.

Kirchner, Roy P., to Idacon, Inc. Method and composition for treating wood with pentachlorophenolmlRe. 33,121, Cl. 427-440.000.

Nagae, Yoshiharu; Isogai, Masato; Kawakami, Hideaki; and Nakano, Fumio, to Hitachi, Ltd. Method for driving liquid crystal element employing ferroelectric liquid crystalmlRe. 33,120, Cl. 350-350.00S.

Nakano, Fumio: *See*—
Nagae, Yoshiharu; Isogai, Masato; Kawakami, Hideaki; and Nakano, Fumio, Re. 33,120, Cl. 350-350.00S.

Scheitlin, George E.; Sickels, Mark A.; and Usleman, Robert T., to Arvin Industries, Inc. Exhaust processormlRe. 33,118, Cl. 60-299.000.

Sickels, Mark A.: *See*—
Scheitlin, George E.; Sickels, Mark A.; and Usleman, Robert T., Re. 33,118, Cl. 60-299.000.

Usleman, Robert T.: *See*—
Scheitlin, George E.; Sickels, Mark A.; and Usleman, Robert T., Re. 33,118, Cl. 60-299.000.

Whirlpool Corporation: *See*—
Baker, Daniel A., Re. 33,119, Cl. 374-102.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Motor Wheel Corporation: *See*—

Smith, William T., B1 4,574,859, Cl. 152-410.000.

Mumford, John L.; and Price, Roger F., to TI (Group Services) Limited. Vitreous enamelsmlB1 4,555,415, 11-28-89, Cl. 427-193.000.

Price, Roger F.: *See*—
Mumford, John L.; and Price, Roger F., B1 4,555,415, Cl. 427-193.000.

Smith, William T., to Motor Wheel Corporation. Rim assemblymlB1 4,574,859, 11-28-89, Cl. 152-410.000.

TI (Group Services) Limited: *See*—
Mumford, John L.; and Price, Roger F., B1 4,555,415, Cl. 427-193.000.

LIST OF DESIGN PATENTEES

AB John Sjoding: *See*—
Tofft, Klas, 304,858, Cl. D24-10.000.

Allison, Donald J.; and Spielman, Rodney J., to Golftech Inc. Ball retriever head assemblyml304,851, 11-28-89, Cl. D21-234.000.

Angeles Nursery Toys, Inc.: *See*—
Kelly, Ray G., 304,813, Cl. D12-113.000.

Aoki, Hisao, to Sanden Corporation. Heat exchangerml304,855, 11-28-89, Cl. D23-386.000.

Aoki, Hisao, to Sanden Corporation. Heat exchangerml304,856, 11-28-89, Cl. D23-386.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Koshino, Susumu, 304,836, Cl. D16-209.000.
Onuma, Koki, 304,837, Cl. D16-217.000.
Yamamoto, Masato, 304,838, Cl. D16-217.000.

Atwood Industries, Inc.: *See*—
Chambers, James W., 304,818, Cl. D12-162.000.

Barone, Reina A.; and Burtch, Bruce W., to Burtch Barone, Inc. Organizer trayml304,842, 11-28-89, Cl. D19-75.000.

Baus, Heinz G. Mirrored cabinetml304,792, 11-28-89, Cl. D6-559.000.

Bob's Candies, Inc.: *See*—
Young, Donald H., 304,803, Cl. D9-341.000.
Young, Donald H., 304,804, Cl. D9-341.000.

Bridge Products, Inc.: *See*—
Earley, John R.; and Stewart, Paul, 304,817, Cl. D12-153.000.

Bulgari, Paolo, to Partecipazioni Bulgari S.p.A. Link elementml304,809, 11-28-89, Cl. D11-93.000.

Burke, Doris. Jewelry display rackml304,793, 11-28-89, Cl. D6-569.000.

Burtch Barone, Inc.: *See*—
Barone, Reina A.; and Burtch, Bruce W., 304,842, Cl. D19-75.000.

Burtch, Bruce W.: *See*—
Barone, Reina A.; and Burtch, Bruce W., 304,842, Cl. D19-75.000.

Carithers, Charles H., Jr. Mat marking and guide devicesml304,808, 11-28-89, Cl. D10-65.000.

Casio Computer Co., Ltd.: *See*—
Naito, Yoshitaka, 304,839, Cl. D17-14.000.

Chambers, Arthur E. Trampoline exerciserml304,850, 11-28-89, Cl. D21-235.000.

Chambers, James W., to Atwood Industries, Inc. Trailer coupler yokeml304,818, 11-28-89, Cl. D12-162.000.

Chapman, Leif H.; and Ruzzin, Richard F., to General Motors Corporation. Combined rear spoiler and lightml304,819, 11-28-89, Cl. D12-181.000.

Cold Steel, Inc.: *See*—
Thompson, Lynn C., 304,798, Cl. D7-151.000.

De brey, Robert J. Display buttonml304,812, 11-28-89, Cl. D11-227.000.

Derby Cycle Corporation, The: *See*—
Haro, Robert B., 304,814, Cl. D12-114.000.

DeVigili, James J. Toothpaste dispenserml304,791, 11-28-89, Cl. D6-542.000.

De Witt, F. Carlos, to Romana Acosta. Carrying caseml304,784, 11-28-89, Cl. D3-76.000.

DiCola, Vince, to Thomas Industries Inc. Cornice lighting reflector or the likeml304,862, 11-28-89, Cl. D26-76.000.

Dreicer, Scott M.; and Shriftman, Morris. Dollml304,848, 11-28-89, Cl. D21-155.000.

Earley, John R.; and Stewart, Paul, to Bridge Products, Inc. Tire valveml304,817, 11-28-89, Cl. D12-153.000.

Eckenrode, Doris A. Scrotal supporterml304,775, 11-28-89, Cl. D2-10.000.

Endo, Hiroshi: *See—*
Saegusa, Masahito; Hashimoto, Kazunori; Kawakatsu, Yoshihiro; Ohuchi, Katsubumi; Endo, Hiroshi; and Sato, Masaki, 304,874, Cl. D14-118.000.

Everest & Jennings, Inc.: *See—*
Jones, Ralph P., 304,815, Cl. D12-133.000.

FA. HEWI Heinrich Wilke GmbH: *See—*
Scholl, Winfried, 304,789, Cl. D6-484.000.

Forman, Robert S., to Roberts Incentives Corporation. Brief bagml304,783, 11-28-89, Cl. D3-71.000.

Freese, T. Brent, to Rubbermaid Commercial Products Inc. Pitcherml304,799, 11-28-89, Cl. D7-319.000.

Freund, David M.: *See—*
Strongosky, John M.; and Freund, David M., 304,787, Cl. D6-450.000.

Fushiya, Fusao; Okumura, Michio; and Kubota, Yoshiyuki, to Makita Electric Works, Ltd. Battery packml304,822, 11-28-89, Cl. D13-8.000.

General Motors Corporation: *See—*
Chapman, Leif H.; and Ruzzin, Richard F., 304,819, Cl. D12-181.000.

Gingher, Robert S., to Scissaires, Inc. Handle unit for shearsml304,801, 11-28-89, Cl. D8-57.000.

Glenn, Joseph G. Combined bib and container pouchml304,777, 11-28-89, Cl. D2-229.000.

Gold Star Co., Ltd.: *See—*
Yoo, Seung H., 304,800, Cl. D7-351.000.

Golftech Inc.: *See—*
Allison, Donald J.; and Spielman, Rodney J., 304,851, Cl. D21-234.000.

Habicht, Helmut. Rotary actuatorml304,834, 11-28-89, Cl. D15-148.000.

Hahn, Daniel G. Toy riding airplaneml304,846, 11-28-89, Cl. D21-77.000.

Hanson, Patrick. Compact disc holderml304,781, 11-28-89, Cl. D3-35.000.

Hara, Kunio; and Hiroki, Shin-ichi, to Kabushiki Kaisha Toshiba. Combination printer and image scannerml304,824, 11-28-89, Cl. D14-107.000.

Hara, Kunio; and Hiroki, Shin-ichi, to Kabushiki Kaisha Toshiba. Image scannerml304,825, 11-28-89, Cl. D14-107.000.

Haro, Robert B., to Derby Cycle Corporation, The. Foldable footpeg for bicycleml304,814, 11-28-89, Cl. D12-114.000.

Hasegawa, Sigeru: *See—*
Ito, Masafumi; Hasegawa, Sigeru; Takita, Haruki; and Sube, Minoru, 304,829, Cl. D14-135.000.

Hashimoto, Kazunori: *See—*
Saegusa, Masahito; Hashimoto, Kazunori; Kawakatsu, Yoshihiro; Ohuchi, Katsubumi; Endo, Hiroshi; and Sato, Masaki, 304,874, Cl. D14-118.000.

Hella KG Hueck & Co.: *See—*
Schmidt, Gerd, 304,861, Cl. D26-29.000.

Hiroki, Shin-ichi: *See—*
Hara, Kunio; and Hiroki, Shin-ichi, 304,824, Cl. D14-107.000.
Hara, Kunio; and Hiroki, Shin-ichi, 304,825, Cl. D14-107.000.

Hitachi, Ltd.: *See—*
Saegusa, Masahito; Hashimoto, Kazunori; Kawakatsu, Yoshihiro; Ohuchi, Katsubumi; Endo, Hiroshi; and Sato, Masaki, 304,874, Cl. D14-118.000.

Hodges, Robert A. Eyeglass frameml304,835, 11-28-89, Cl. D16-107.000.

Horger, John S. Label peelerml304,841, 11-28-89, Cl. D19-69.000.

Hsiao, Howell: *See—*
Pfeifer, Herbert; and Hsiao, Howell, 304,823, Cl. D14-100.000.

Iacovelli, Marc R., to Rally Manufacturing, Inc. Quartz digital clock with pull out bracket and universal mountml304,807, 11-28-89, Cl. D10-15.000.

Inglee, Philip R. Connectable toppling toyml304,845, 11-28-89, Cl. D21-59.000.

Inglee, Philip R. Connectable toppling toyml304,847, 11-28-89, Cl. D21-59.000.

Ito, Masafumi; Hasegawa, Sigeru; Takita, Haruki; and Sube, Minoru, to Teac Corporation. Combined compact disc player and tape recorderml304,829, 11-28-89, Cl. D14-135.000.

Jebb, Richard P. Trash funnelml304,872, 11-28-89, Cl. D34-1.000.

John Manufacturing Limited: *See—*
Yuen, John S., 304,871, Cl. D32-18.000.

John O. Butler Company: *See—*
Tarrson, Emanuel B.; Maric, Dane; and Kelly, Thomas P., 304,785, Cl. D4-104.000.

Jones, Ralph P., to Everest & Jennings, Inc. Wheelchair wheelml304,815, 11-28-89, Cl. D12-133.000.

Joytec Ltd.: *See—*
Tonner, Peter S., 304,843, Cl. D21-11.000.

Kabushiki Kaisha Toshiba: *See—*
Hara, Kunio; and Hiroki, Shin-ichi, 304,824, Cl. D14-107.000.
Hara, Kunio; and Hiroki, Shin-ichi, 304,825, Cl. D14-107.000.
Sutoh, Shigeru, 304,826, Cl. D14-117.000.
Sutoh, Shigeru, 304,830, Cl. D14-138.000.

Kawakatsu, Yoshihiro: *See—*
Saegusa, Masahito; Hashimoto, Kazunori; Kawakatsu, Yoshihiro; Ohuchi, Katsubumi; Endo, Hiroshi; and Sato, Masaki, 304,874, Cl. D14-118.000.

Kayamura, Naoji: *See—*
Kayamura, Yoshikazu, 304,786, Cl. D4-104.000.

Kayamura, Yoshikazu, to Kayamura, Naoji. Tooth brushml304,786, 11-28-89, Cl. D4-104.000.

Kelly, Ray G., to Angeles Nursery Toys, Inc. Tricycleml304,813, 11-28-89, Cl. D12-113.000.

Kelly, Thomas P.: *See—*
Tarrson, Emanuel B.; Maric, Dane; and Kelly, Thomas P., 304,785, Cl. D4-104.000.

Klopp, Randall B. Beverage cup holderml304,795, 11-28-89, Cl. D7-70.000.

Koshino, Susumu, to Asahi Kogaku Kogyo Kabushiki Kaisha. 35 mm cameraml304,836, 11-28-89, Cl. D16-209.000.

Kubota, Mineo, to Nippon Seimitsu Kogyo Kabushiki Kaisha. Image scannerml304,827, 11-28-89, Cl. D14-116.000.

Kubota, Yoshiyuki: *See—*
Fushiya, Fusao; Okumura, Michio; and Kubota, Yoshiyuki, 304,822, Cl. D13-8.000.

Le, Tuan N.; and Litchfield, Paul E., to Reebok International Ltd. Outsole for a shoeml304,778, 11-28-89, Cl. D2-320.000.

Lecuyer, Francois: *See—*
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Le, Tuan N.; and Litchfield, Paul E., 304,778, Cl. D2-320.000.

Luchsinger, Pedro W. Piston diaphragm pump for attachment to pressurized sprayer containersml304,833, 11-28-89, Cl. D15-7.000.

Lumec, Inc.: *See—*
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Makita Electric Works, Ltd.: *See—*
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Matsushita Electric Works, Ltd.: *See—*
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Mattox, Connie. Protective facial maskml304,869, 11-28-89, Cl. D29-8.000.

McJunkin, Claude L. Combined golf club and ball display standml304,788, 11-28-89, Cl. D6-467.000.

Mednis, Juris M., to Universal Symetrics Corporation. Bottleml304,805, 11-28-89, Cl. D9-376.000.

Mednis, Juris M., to Universal Symetrics Corporation. Bottleml304,806, 11-28-89, Cl. D9-376.000.

Mendenhall, George A. Zig zag french fry slab cutter knifeml304,796, 11-28-89, Cl. D7-106.000.

Mizutani, Keiichi; and Ohashi, Akira, to Shachihata Industrial Co., Ltd. Marking penml304,840, 11-28-89, Cl. D19-43.000.

Morris, George A., Jr. Novelty fanml304,780, 11-28-89, Cl. D3-4.000.

Murphy, Patrick J., to Quaker Oats Company, The. Tape recorderml304,832, 11-28-89, Cl. D14-165.000.

Naito, Yoshitaka, to Casio Computer Co., Ltd. Electronic guitarml304,839, 11-28-89, Cl. D17-14.000.

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Nippon Seimitsu Kogyo Kabushiki Kaisha: *See—*
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O'Dohanue, Nicolas; and Lecuyer, Francois, to Lumec, Inc. Streetlampml304,860, 11-28-89, Cl. D26-67.000.

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Onuma, Koki, to Asahi Kogaku Kogyo Kabushiki Kaisha. Single-lens reflex camera bodyml304,837, 11-28-89, Cl. D16-217.000.

Partecipazioni Bulgari S.p.A.: *See—*
Bulgari, Paolo, 304,809, Cl. D11-93.000.

Perkins, Dallas. Utensil for opening hard-shelled seafoodml304,797, 11-28-89, Cl. D7-106.000.

Pery, Edmond; and Pery, Edmond, to Sunset Collection S.P.R.L. Faucet spoutml304,853, 11-28-89, Cl. D23-257.000.

Pery, Edmond: *See—*
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Precisioncraft Limited: *See—*
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Quaker Oats Company, The: *See*—
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Rasmussen, Craig. Lower side protector for vehiclesml304,820, 11-28-89, Cl. D12-190.000.
Ratony, Alexander. Tri-channel wing aircraftml304,821, 11-28-89, Cl. D12-331.000.
Reebok International Ltd.: *See*—
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Rubbermaid Commercial Products Inc.: *See*—
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Schmidt, Gerd, to Hella KG Hueck & Co. Auxiliary headlamp for motor vehiclesml304,861, 11-28-89, Cl. D26-29.000.
Scholl, Winfried, to FA. HEWI Heinrich Wilke GmbH. Accent tableml304,789, 11-28-89, Cl. D6-484.000.
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Seiffert, Florian: *See*—
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Shachihata Industrial Co., Ltd.: *See*—
Mizutani, Keiichi; and Ohashi, Akira, 304,840, Cl. D19-43.000.
Sheard, Timothy. Food-catching trayml304,794, 11-28-89, Cl. D7-37.000.
Shriftman, Morris: *See*—
Dreicer, Scott M.; and Shriftman, Morris, 304,848, Cl. D21-155.000.
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Smith, Robert L. Football digital display marker or similar articleml304,844, 11-28-89, Cl. D10-46.100.
Spencer, Paul. Safety razor and standml304,868, 11-28-89, Cl. D28-73.000.
Spielman, Rodney J.: *See*—
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Stackhouse Associates: *See*—
Stackhouse, Wyman H.; and Williamson, Ian M., 304,854, Cl. D23-365.000.
Stackhouse, Wyman H.; and Williamson, Ian M., to Stackhouse Associates. Portable air filterml304,854, 11-28-89, Cl. D23-365.000.
Starlight Industries, Inc.: *See*—
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Stein, Robert F. Eyelash curlerml304,864, 11-28-89, Cl. D28-36.000.
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Strongosky, John M.; and Freund, David M., to RPM Industries, Inc. Hosiery display standml304,787, 11-28-89, Cl. D6-450.000.
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Sutoh, Shigeru, to Kabushiki Kaisha Toshiba. Integrated circuit card with magnetic reader strip and keyboard and displayml304,826, 11-28-89, Cl. D14-117.000.
Sutoh, Shigeru, to Kabushiki Kaisha Toshiba. Mobile telephone setml304,830, 11-28-89, Cl. D14-138.000.
Takita, Haruki: *See*—
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Tarrson, Emanuel B.; Maric, Dane; and Kelly, Thomas P., to John O. Butler Company. Toothbrushml304,785, 11-28-89, Cl. D4-104.000.
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Teac Corporation: *See*—
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Thomas Industries Inc.: *See*—
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Thurman, Rick K. Combined planter and coverml304,810, 11-28-89, Cl. D11-149.000.
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Tonner, Peter S., to Joytec Ltd. Simulated golf game apparatusml304,843, 11-28-89, Cl. D21-11.000.
Universal Symetrics Corporation: *See*—
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Yi, Han Ung, to Starlight Industries, Inc. Easel hingeml304,802, 11-28-89, Cl. D8-328.000.
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Yoo, Seung H., to Gold Star Co., Ltd. Microwave ovenml304,800, 11-28-89, Cl. D7-351.000.
Young, Donald H., to Bob's Candies, Inc. Package for candy canesml304,803, 11-28-89, Cl. D9-341.000.
Young, Donald H., to Bob's Candies, Inc. Package for candy canesml304,804, 11-28-89, Cl. D9-341.000.
Yuen, John S., to John Manufacturing Limited. Combined rechargeable vacuum cleaner and chargerml304,871, 11-28-89, Cl. D32-18.000.
Zusman, Bertram. One story pedestal duplexml304,859, 11-28-89, Cl. D25-17.000.

LIST OF PLANT PATENTEES

Duemmen, Guenter. Dueromml7,059, 11-28-89, Cl. 68.000.

Duemmen, Guenter. Duelegml7,060, 11-28-89, Cl. 68.000.

CLASSIFICATION OF PATENTS

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NOTE.—First number, class; second number, subclass; third number, patent number

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62.2 4,883,546
73.4 4,883,547
99 4,883,548
161 4,883,549
171 4,883,550
178 4,883,551
180 4,883,552
193 4,883,553
219 4,883,554
227 4,883,555
273.3 4,883,556
287 4,883,557
292 4,883,558
603 4,883,559
626 4,883,560
633 4,883,561
643 4,883,562
645 4,883,563

CLASS 160

32 4,883,109

CLASS 162

112 4,883,564

CLASS 164

249 4,883,110
428 4,883,113
436 4,883,111
459 4,883,112
478 4,883,114

CLASS 165

1 4,883,115
104.26 4,883,116
164 4,883,117

CLASS 166

55.3 4,883,118
72 4,883,119
98 4,883,120

217 4,883,121
263 4,883,122
264 4,883,123
291 4,883,125
307 4,883,124

CLASS 172

26 4,883,126
126 4,883,127
430 4,883,128
777 4,883,129

CLASS 173

12 4,883,130

CLASS 174

1 4,883,918
48 4,883,924
68.5 4,883,920
84 R 4,883,925
87 4,883,921
93 4,883,919
125.1 4,883,922
158 F 4,883,923

CLASS 175

44 4,883,131
65 4,883,132
93 4,883,133
96 4,883,134
323 4,883,135
339 4,883,136

CLASS 178

18 4,883,926

CLASS 180

6.34 4,883,137
68.6 4,883,139
116 4,883,140
243 4,883,141
245 4,883,142
249 4,883,138

CLASS 181

198 4,883,144
286 4,883,143

CLASS 182

2 4,883,145
5 4,883,146
179 4,883,147

CLASS 184

6.4 4,883,148

CLASS 188

264 E 4,883,149
289 4,883,150

CLASS 192

4 A 4,883,151
42 4,883,152
45.1 4,882,941
70.27 4,883,153
98 4,883,154
4,883,155
106.2 4,883,156

CLASS 193

34 4,883,157

CLASS 194

217 4,883,158

CLASS 198

328 4,883,160
347 4,883,161
374 4,883,162
460 4,883,163
468.4 4,883,164
626 4,883,159
682 4,883,165
688.1 4,883,166
712 4,883,167

CLASS 2.3

20 4,883,488

CLASS 200

5 R 4,883,929
50 C 4,883,927
81.9 M 4,883,928
148 F 4,883,930
148 R 4,883,931
339 4,883,932

CLASS 204

1 T 4,883,566
39 4,883,567
129.43 4,883,568
157.74 4,883,569
164 4,883,570
180.2 4,883,565
180.6 4,883,571
181 F 4,883,572
182.4 4,883,573
192.15 4,883,574
198 4,883,575
224 M 4,883,576
299 R 4,883,577
300 EC 4,883,578
403 4,883,579

CLASS 206

152 4,883,168
170 4,883,169
315.1 4,883,170
315.11 4,883,171
328 4,883,172
366 4,883,173
378 4,883,174
387 4,883,175
4,883,176
391 4,883,177
4,883,178
523 4,883,179
534 4,883,180
4,883,182

CLASS 208

48 AA 4,883,580
48 R 4,883,581
106 4,883,582
113 4,883,583

CLASS 209

38 4,883,584
166 4,883,585
167 4,883,586
534 4,883,181
4,883,183

CLASS 210

94 4,883,587
117 4,883,588
140 4,883,589
164 4,883,590
223 4,883,591
227 4,883,592
500.32 4,883,593
603 4,883,594
634 4,883,595
638 4,883,596
640 4,883,597
656 4,883,598
670 4,883,599
696 4,883,600
710 4,883,601
776 4,883,602
802 4,883,603

CLASS 212

146 4,883,184
147 4,883,185
184 4,883,186

CLASS 215

1 R 4,883,187
12.1 4,883,188

CLASS 219

10.55 E 4,883,935
10.55 F 4,883,936
69.12 4,883,933
4,883,934
121.64 4,883,937
124.34 4,883,938
125.1 4,883,939
203 4,883,940
216 4,883,941
227 4,883,942
306 4,883,943
492 4,883,944
523 4,883,946
541 4,883,945
553 4,883,947

CLASS 220

1 T 4,883,189
66 4,883,190
83 4,883,191
85 SP 4,883,192
266 4,883,193
307 4,883,194
339 4,883,195
415 4,883,196

CLASS 221

26 4,883,197

CLASS 222

1 4,883,198
14 4,883,199
77 4,883,200
105 4,883,201
109 4,883,202
143 4,883,203
192 4,883,204

CLASS 224

32 R 4,883,205
153 4,883,206
4,883,207
316 4,883,208

CLASS 226

92 4,883,209
100 4,883,210

CLASS 227

9 4,883,211
4,883,212
10 4,883,213

CLASS 228

9 4,883,214
116 4,883,215
119 4,883,216
122 4,883,217
4,883,218
190 4,883,219

CLASS 229

69 4,883,220
143 4,883,221
160.2 4,883,222

CLASS 232

35 4,883,223
43.1 4,883,224

CLASS 235

382 4,883,948
440 4,883,950
449 4,883,949

CLASS 236

34.5 4,883,225

CLASS 237

12.3 C 4,883,226

CLASS 239

120 4,883,227
279 4,883,228
587 4,883,229

CLASS 242

25 R 4,883,230
35.5 A 4,883,231
55.2 4,883,232
66 4,883,233
67.3 R 4,883,234
71.1 4,883,235
4,883,236
83 4,883,237
317 4,883,238

CLASS 244

3.15 4,883,239
69 4,883,240
114 R 4,883,241
118.5 4,883,242
122 R 4,883,243
171 4,883,244

CLASS 246

2 R 4,883,245

CLASS 248

165 4,883,246
542 4,883,247
550 4,883,248
566 4,883,249
638 4,883,250

CLASS 249

53 R 4,883,251

CLASS 250

201 4,883,951
225 4,883,952
226 4,883,953
227 4,883,954
231 SE 4,883,955
269 4,883,956
283 4,883,957
288 4,883,958
306 4,883,959
327.2 4,883,960
4,883,961
334 4,883,962
339 4,883,963
341 4,883,964
4,883,965
363.02 4,883,966
370.01 4,883,967
423 R 4,883,968
427 4,883,969
483.1 4,883,970
495.1 4,883,971
575 4,883,972

CLASS 251

129.18 4,883,252
315 4,883,253
335.2 4,883,254

CLASS 252

8.551 4,883,605
8.9 4,883,604
32.5 4,883,606
174.18 4,883,607
189 4,883,608
299.61 4,883,609
559 4,883,610

CLASS 254

266 4,883,255

CLASS 256

22 4,883,256
54 4,883,257

CLASS 260

402 4,883,612
408 4,883,613
413 4,883,614

CLASS 261

64.4 4,883,616

CLASS 264

29.7 4,883,617
49 4,883,618
60 4,883,619
72 4,883,620
86 4,883,621
108 4,883,622
4,883,623
112 4,883,624
136 4,883,625
156 4,883,626
157 4,883,627
178 F 4,883,628
289.6 4,883,629
513 4,883,630
528 4,883,631
544 4,883,632
550 4,883,633
555 4,883,634

CLASS 266

148 4,883,258
217 4,883,259

CLASS 267

140.1 4,883,260
158 4,883,261
175 4,883,262
293 4,883,263

CLASS 271

110 4,883,264
220 4,883,265
291 4,883,266

CLASS 272

3 4,883,267
73 4,883,268
76 4,883,635
117 4,883,269
134 4,883,270

CLASS 273

1 GC 4,883,271
26 A 4,883,272
110 4,883,273
164 4,883,274
172 4,883,275
183 B 4,883,276
236 4,883,277
241 4,883,278
269 4,883,636

CLASS 277

1 4,883,279

CLASS 280

3 4,883,280
33.992 4,883,281
43.24 4,883,282
204 4,883,283
293 4,883,284
491.5 4,883,285
629 4,883,286
665 4,883,287
672 4,883,288
684 4,883,289
814 4,883,290

CLASS 283

117 4,883,291

CLASS 285

55 4,883,292
364 4,883,293

CLASS 290

31 4,883,973

CLASS 292

148 4,883,294
307 R 4,883,295
336.3 4,883,296
339 4,883,297
341.12 4,883,298

CLASS 293

110 4,883,299

CLASS 294

2 4,883,300
77 4,883,301

CLASS 296

37.1 4,883,302
91 4,883,303
97.8 4,883,304
105 4,883,305
162 4,883,306
180.2 4,883,307
185 4,883,308
194 4,883,309
210 4,883,310
213 4,883,311
214 4,883,312
216 4,883,313

CLASS 297

159 4,883,314
184 4,883,315
191 4,883,316
193 4,883,317
234 4,883,318
354 4,883,319
452 4,883,320

CLASS 298

17.7 4,883,321

CLASS 299

34 4,883,322
42 4,883,323

CLASS 301

9 TV 4,883,324

CLASS 303

96 4,883,325
110 4,883,326
116 4,883,327
4,883,328

CLASS 307

10.1 4,883,974
112 4,883,983
256 4,883,984
279 4,883,985
290 4,883,975
291.2 4,883,976
298 4,883,986
355 4,883,987
401 4,883,977
443 4,883,978
4,883,988
446 4,883,979
448 4,883,989
465.1 4,883,980
473 4,883,990
491 4,883,991
4,883,992
542.1 4,883,993

CLASS 310

12 4,883,994
40 R 4,883,981
55 4,883,995
62 4,883,982
154 4,883,996
179 4,883,997
239 4,883,998
254 4,883,999
268 4,884,000
313 A 4,884,001
323 4,884,002
328 4,884,003

CLASS 312

1 4,883,329
195 4,883,330
4,883,331
330.1 4,883,332

CLASS 313

402 4,884,004
404 4,884,005
474 4,884,006
573 4,884,007

CLASS 315

152 4,884,008
246 4,884,009
366 4,884,010
368 4,884,011
397 4,884,012

CLASS 318

481 4,884,013
600 4,884,014
640 4,884,015
685 4,884,016

CLASS 320

2 4,884,017

CLASS 322

8 4,884,018

CLASS 324

77 R 4,884,019
83 D 4,884,020
142 4,884,021
157 4,884,022
158 F 4,884,024
4,884,026
4,884,027
158 MG 4,884,023
158 SC 4,884,025
213 4,884,028
309 4,884,029
344 4,884,030
459 4,884,031
503 4,884,033
504 4,884,032
529 4,884,034

CLASS 328

133 4,884,035
167 4,884,036

CLASS 329

336 4,884,037

CLASS 330

4.3 4,884,044
165 4,884,038
253 4,884,039

CLASS 331

1 A 4,884,040
57 4,884,041
113 R 4,884,042
186 4,884,043

CLASS 333

158 4,884,045
260 4,884,046

CLASS 335

10 4,884,047
18 4,884,048

CLASS 337

36 4,884,049
264 4,884,050

CLASS 338

4 4,884,051
202 4,884,052
275 4,884,053

CLASS 340

309.15 4,884,054
426 4,884,055
453 4,884,056
456 4,884,057
461 4,884,058
514 4,884,059
4,884,060
550 4,884,061
571 4,884,062
572 4,884,063
573 4,884,064
632 4,884,065
633 4,884,066
686 4,884,067
707 4,884,068
799 4,884,069
825.78 4,884,070
854 4,884,071
937 4,884,072

CLASS 341

31 4,884,073
70 4,884,074
159 4,884,075

CLASS 342

5 4,884,076
202 4,884,077
360 4,884,078

CLASS 346

1.1 4,884,079
46 4,884,080
74.6 4,884,081
105 4,884,082
108 4,884,083
136 4,884,084
4,884,085
155 4,884,086
160.1 4,884,188

CLASS 350

96.10 4,883,333
96.13 4,883,334
96.15 4,883,335
96.20 4,883,336
96.29 4,883,337
96.34 4,883,338
4,883,339
260 4,883,340
276 R 4,883,341
320 4,883,342
338 4,883,343
339 R 4,883,344
350 S Re.33,120
418 4,883,345

423 4,883,346
500 4,883,347
503 4,883,348
631 4,883,349

CLASS 351

160 R 4,883,350
221 4,883,351

CLASS 353

122 4,883,352

CLASS 354

75 4,884,087
86 4,884,088
222 4,884,089
234.1 4,884,090
271.1 4,884,091
289.1 4,884,092
299 4,884,093
412 4,884,094

CLASS 355

1 4,884,095
23 4,884,097
27 4,884,098
55 4,884,099
68 4,884,100
4,884,101
77 4,884,102
200 4,884,103
202 4,884,104
212 4,884,105
4,884,106
218 4,884,107
233 4,884,096
234 4,884,108
260 4,884,109
319 4,884,110

CLASS 356

41 4,883,353
128 4,883,354
241 4,883,355
326 4,883,356
349 4,883,357
350 4,883,358
401 4,883,359
402 4,883,360

CLASS 357

05 4,884,111
17 4,884,112
23.4 4,884,113
38 4,884,114
41 4,884,116
42 4,884,115
43 4,884,117
45 4,884,118
58 4,884,119
68 4,884,120
4,884,121
71 4,884,122
4,884,123
72 4,884,124
74 4,884,125
81 4,884,126

CLASS 358

12 4,884,127
29 4,884,128
44 4,884,129
80 4,884,130
88 4,884,131
93 4,884,132
98 4,884,133
4,884,134
103 4,884,135
105 4,884,136
108 4,884,137
133 4,884,138
142 4,884,139
168 4,884,140
174 4,884,141
213.19 4,884,142
213.28 4,884,143
228 4,884,144
229 4,884,145
300 4,884,149
327 4,884,150
330 4,884,151
400 4,884,146
443 4,884,147
464 4,884,148

CLASS 360

78.14 4,884,152
85 4,884,153
104 4,884,154
105 4,884,155
4,884,261
121 4,884,156
125 4,884,157
132 4,884,158
4,884,159

CLASS 361

18 4,884,160
4,884,161
23 4,884,162
58 4,884,163
97 4,884,164
98 4,884,165
333 4,884,166
382 4,884,167
4,884,168
385 4,884,169
414 4,884,170
424 4,884,171

CLASS 362

61 4,884,172
4,884,173
4,884,174
119 4,884,175
135 4,884,176
189 4,884,177
241 4,884,178
295 4,884,179

CLASS 363

21 4,884,180
35 4,884,181
37 4,884,182
41 4,884,183
46 4,884,184
56 4,884,185
132 4,884,186
141 4,884,187

CLASS 364

200 4,884,190
4,884,191
4,884,192
4,884,193
4,884,194
4,884,195
4,884,196
4,884,197
4,884,198
408 4,884,199
413.13 4,884,200
424.01 4,884,202
424.1 4,884,201
426.04 4,884,203
431.01 4,884,205
431.03 4,884,204
4,884,207
431.08 4,884,206
460 4,884,208
468 4,884,209
474.01 4,884,210
474.22 4,884,211
474.31 4,884,189
479 4,884,212
497 4,884,213
505 4,884,214
510 4,884,215
513 4,884,216
4,884,217
4,884,218
514 4,884,219
521 4,884,220
526 4,884,221
550 4,884,222
4,884,223
4,884,224
559 4,884,225
560 4,884,226
565 4,884,227
579 4,884,228
724.11 4,884,229
724.15 4,884,230
736 4,884,231
754 4,884,232
786 4,884,233
900 4,884,234

CLASS 365

2 4,884,235
29 4,884,236
63 4,884,237
105 4,884,238
185 4,884,239
189.09 4,884,240
210 4,884,241
229 4,884,242
234 4,884,243
240 4,884,244

CLASS 366

97 4,883,361
101 4,883,362
157 4,883,363
279 4,884,245

CLASS 367

7 4,884,246
43 4,884,247
73 4,884,248
154 4,884,249
180 4,884,250
188 4,884,251

CLASS 368

10 4,884,252
4,884,253
21 4,884,254
96 4,884,255
223 4,884,256
276 4,884,257
4,884,258

CLASS 369

32 4,884,259
93 4,884,260
136 4,884,262

CLASS 370

16 4,884,263
58.1 4,884,264
70 4,884,265
84 4,884,266
100.1 4,884,267
102 4,884,268
110.1 4,884,269

CLASS 371

21.2 4,884,270
40.2 4,884,271
43 4,884,272
49.4 4,884,273
57.2 4,884,274

CLASS 372

9 4,884,275
21 4,884,276
22 4,884,277
26 4,884,278
29 4,884,279
38 4,884,280
75 4,884,281
97 4,884,282
107 4,884,283

CLASS 374

102 Re.33,119
129 4,883,364
136 4,883,365
184 4,883,366

CLASS 375

1 4,884,284
25 4,884,285
118 4,884,286
121 4,884,287

CLASS 376

272 4,883,637

CLASS 378

51 4,884,288
57 4,884,289
83 4,884,290
99 4,884,291
127 4,884,292
197 4,884,293

CLASS 379

61 4,884,294

CLASS 384

114 4,883,367
458 4,883,368
476 4,883,369
490 4,883,370
559 4,883,371
585 4,883,372
4,883,373
618 4,883,374

CLASS 400

55 4,883,375
83 4,883,376
121 4,883,377
624 4,883,378
697.1 4,883,379

CLASS 401

208 4,883,380

CLASS 402

74 4,883,381

CLASS 403

405.1 4,883,382
407.1 4,883,383

CLASS 404

14 4,883,384
47 4,883,385

CLASS 405

136 4,883,386
195 4,883,387
4,883,388
204 4,883,389

CLASS 406

24 4,883,390

CLASS 407

40 4,883,391

CLASS 409

165 4,883,392

CLASS 410

52 4,883,393

CLASS 411

51 4,883,394
55 4,883,395
4,883,396
174 4,883,397
344 4,883,398
431 4,883,399

CLASS 414

2 4,883,400
273 4,883,401
499 4,883,402

CLASS 415

98 4,883,403
115 4,883,404
137 4,883,405
183 4,883,406
190 4,883,407

CLASS 416

93 R 4,883,408

CLASS 417

43 4,883,409
69 4,883,410
331 4,883,411
387 4,883,412

CLASS 418

55 4,883,413
57 4,883,414

CLASS 419

9 4,883,638
49 4,883,639

CLASS 420

417 4,883,640
502 4,883,745

CLASS 422

50 4,883,641
66 4,883,642
94 4,883,643
104 4,883,644
133 4,883,645
311 4,883,646

CLASS 423

239 4,883,647
290 4,883,648

CLASS 424

1.1 4,883,649
4,883,650
47 4,883,651
59 4,883,652
60 4,883,653
69 4,883,654
70 4,883,655
4,883,656
72 4,883,657
78 4,883,659
4,883,660
80 4,883,658
85.2 4,883,661
101 4,883,662
120 4,883,726
195.1 4,883,663
4,883,673
196.1 4,883,664
417 4,883,665
422 4,883,666
438 4,883,667
448 4,883,668
4,883,669
450 4,883,670

CLASS 425

47 4,883,415
64 4,883,416
122 4,883,671
135 4,883,421
140 4,883,417
217 4,883,418
326.1 4,883,419
464 4,883,420

CLASS 426

2 4,883,672
118 4,883,674
120 4,883,675
314 4,883,676
420 4,883,677
496 4,883,678
532 4,883,679
534 4,883,680
573 4,883,681
580 4,883,682
582 4,883,683
607 4,883,684
658 4,883,685

CLASS 427

38 4,883,686
193 B1 4,555,415
213 4,883,687
285 4,883,688
297 4,883,689
430.1 4,883,690
434.2 4,883,691
440 Re.33,121

CLASS 428

16 4,883,692
34.9 4,883,693
35.2 4,883,694
4,883,695
35.4 4,883,696
35.7 4,883,697
35.9 4,883,698
36.9 4,883,699
113 4,883,700
136 4,883,701
141 4,883,702
142 4,883,703
209 4,883,704
4,883,705
215 4,883,706
219 4,883,707
263 4,883,708
288 4,883,709
336 4,883,710
4,883,711
367 4,883,712
397 4,883,713
412 4,883,714
421 4,883,715
4,883,716
423.1 4,883,615
458 4,883,717
4,883,718
541 4,883,719
552 4,883,720
623 4,883,721
625 4,883,722
653 4,883,723

CLASS 429

23 4,883,724
99 4,883,725
145 4,883,727
160 4,883,728
179 4,883,729

CLASS 430

18 4,883,730
41 4,883,731
49 4,883,732
54 4,883,733
109 4,883,734
4,883,735
110 4,883,736
138 4,883,737
4,883,738
192 4,883,739
270 4,883,740
4,883,741
275 4,883,742
321 4,883,743
325 4,883,744
504 4,883,746
542 4,883,747
567 4,883,748

CLASS 431

182 4,883,422
328 4,883,423

CLASS 432

77 4,883,424

CLASS 433

32 4,883,425
91 4,883,426

CLASS 434

247 4,883,749

CLASS 435

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177 4,883,754
240.2 4,883,755
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252.3 4,883,756
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289 4,883,759
296 4,883,760
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129 4,883,771
200 4,883,772
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211 4,883,774
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557 4,883,817
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616 4,883,820
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4,883,270	4,884,123	4,884,048	4,883,050	4,883,662	4,883,644
4,883,274	4,884,157	4,884,164	4,883,054	4,883,963	4,883,664
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4,883,280	4,884,165	4,883,605	4,883,128	4,883,317	4,883,801
4,883,295	4,884,172	4,883,831	4,883,129	4,884,173	4,883,968
4,883,297	4,884,177	4,883,849	4,883,130	22 : 4,882,901	4,883,995
4,883,300	4,884,179	4,883,850	4,883,148	4,883,046	4,884,007
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DESIGN PATENTS

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27 : 304,812
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37 : 304,859
39 : 304,820
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51 : 304,799
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CLASSIFICATION OF PLANTS

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7,060

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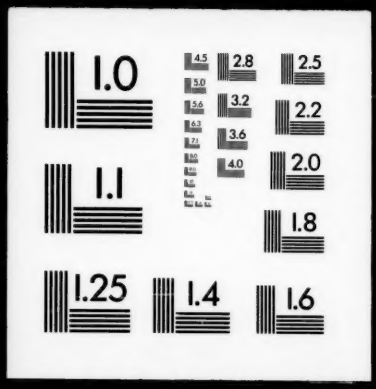
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